Buyer's Guide to Light Pens

June/July 1985
$2.50 U.S.

commodore power/play

$3.50 Canada ISSN 0739-8018

BRAIN GAMES

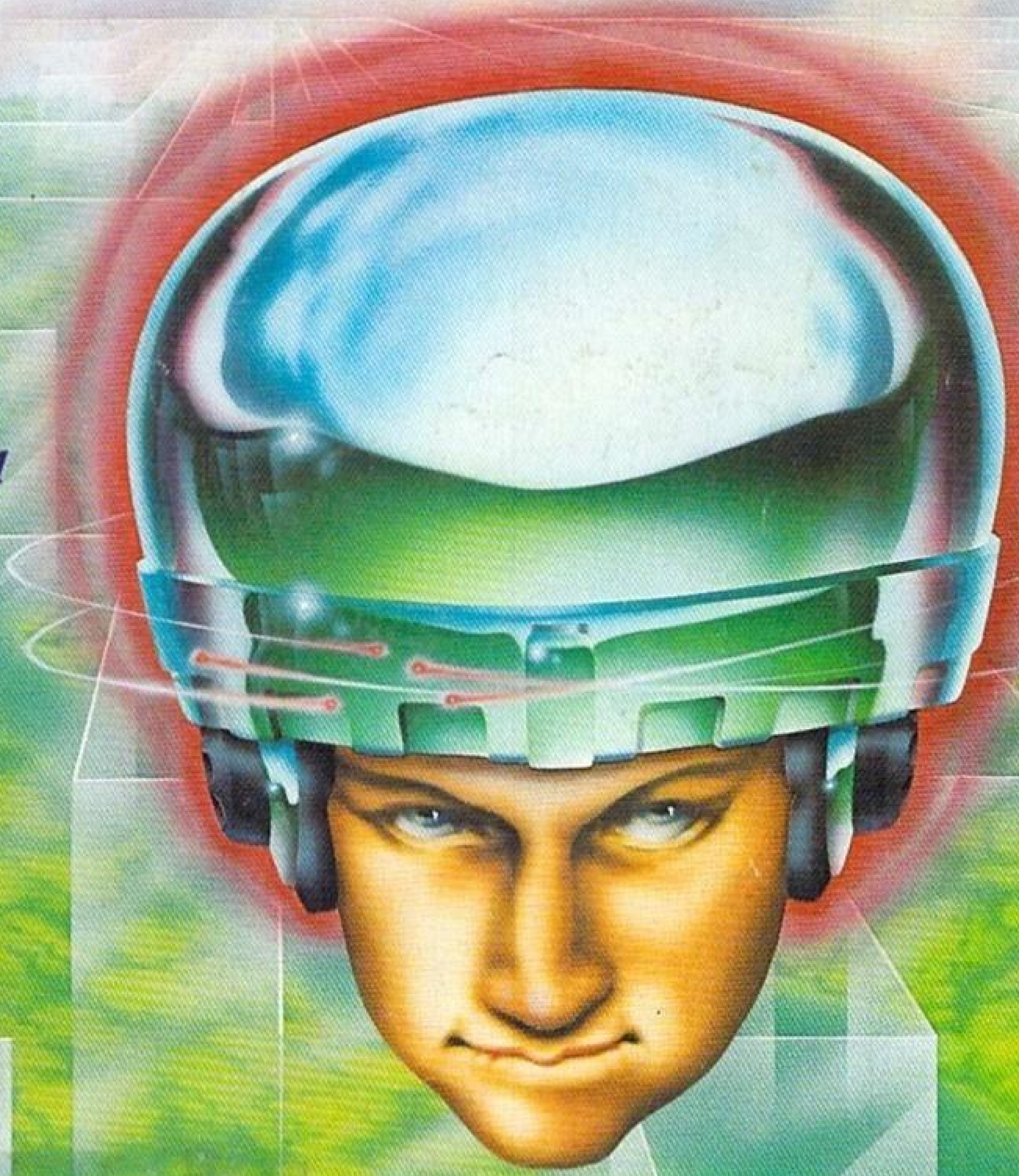
Trivia
Word Games
Fantasy
Strategy

Game Reviews

Micro League Baseball
Slap Shot
Spy vs. Spy
Championship Lode Runner

Free Programs to Type and Save

Flip 64
Label Maker
Marquee



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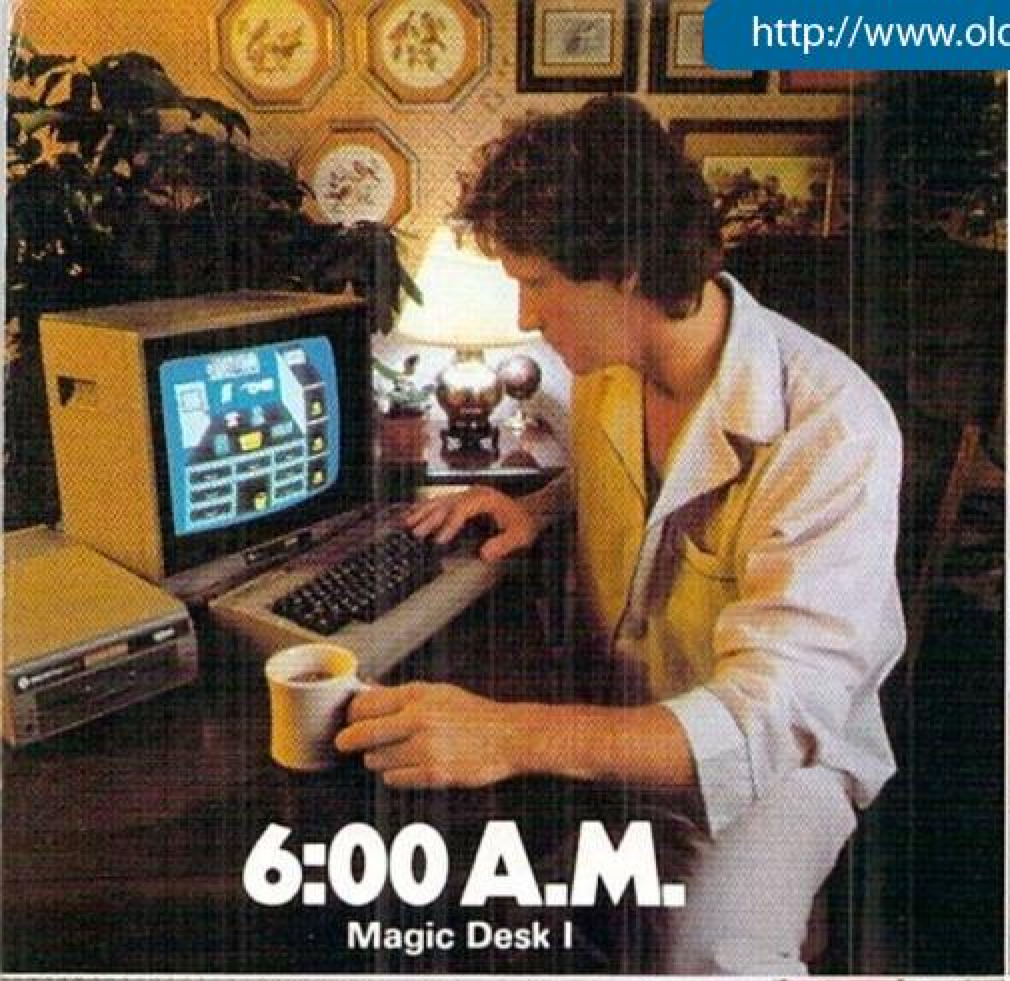
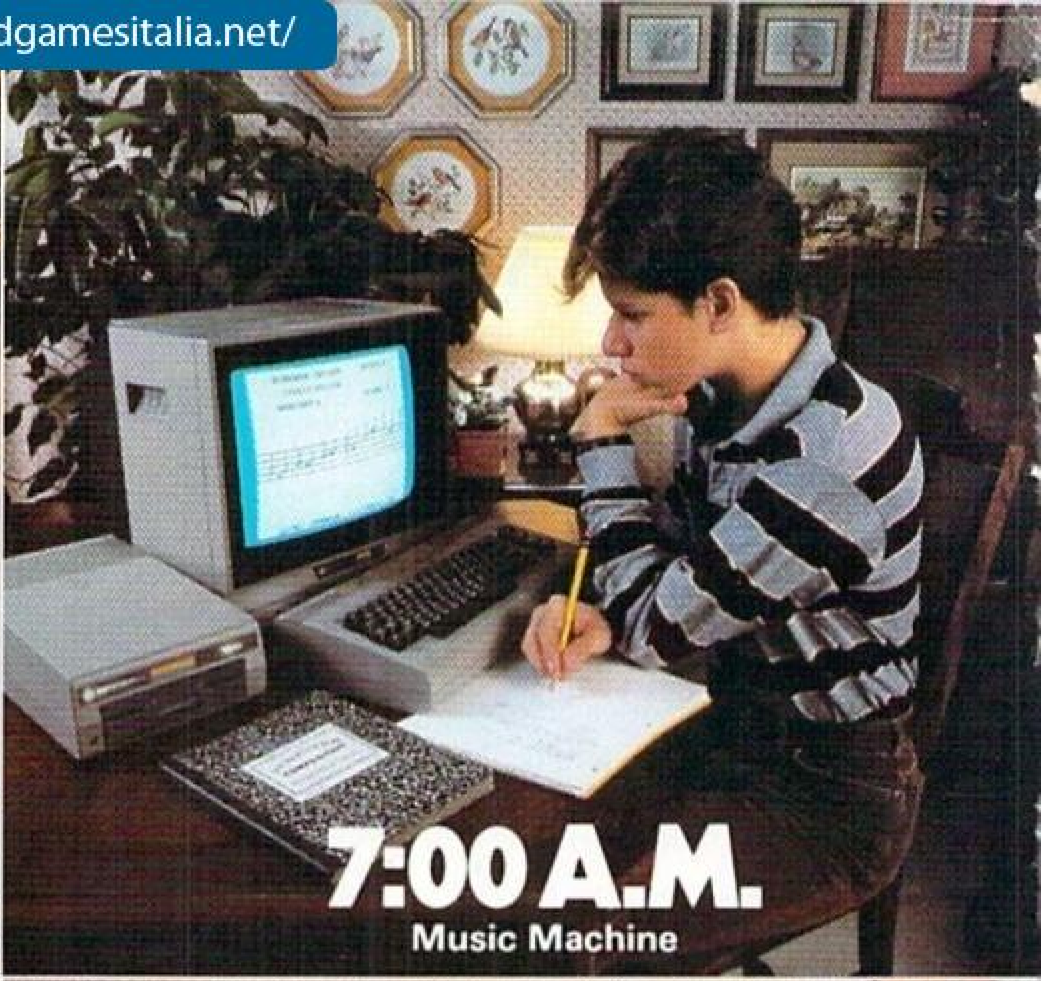
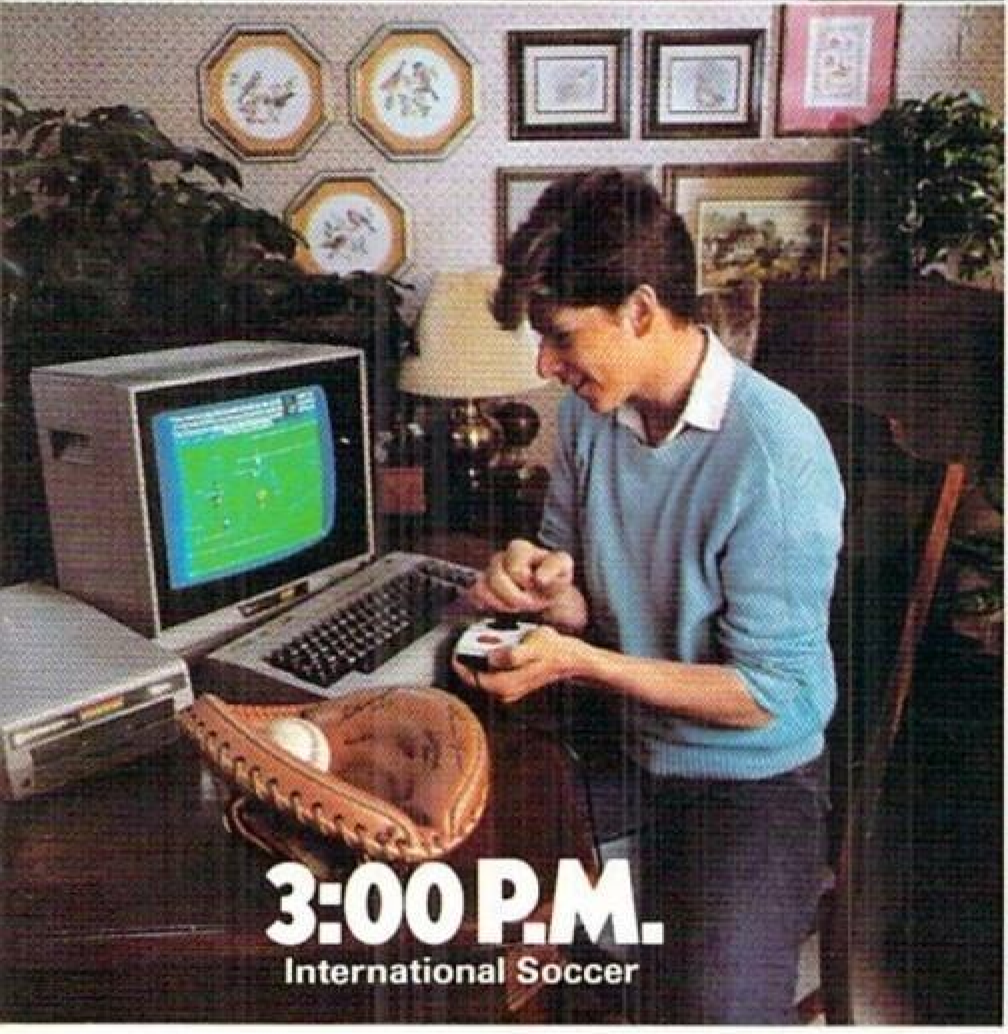


6:00 A.M.
Magic Desk I



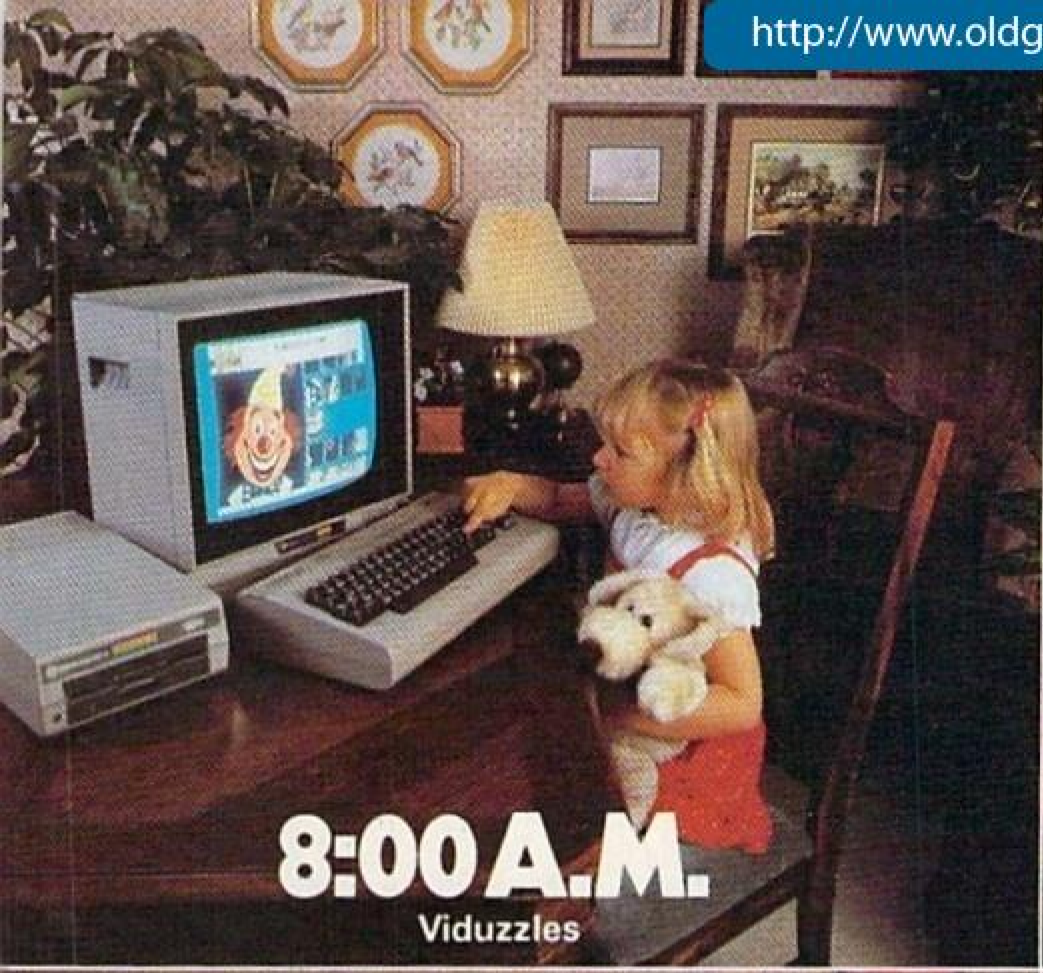
7:00 A.M.
Music Machine

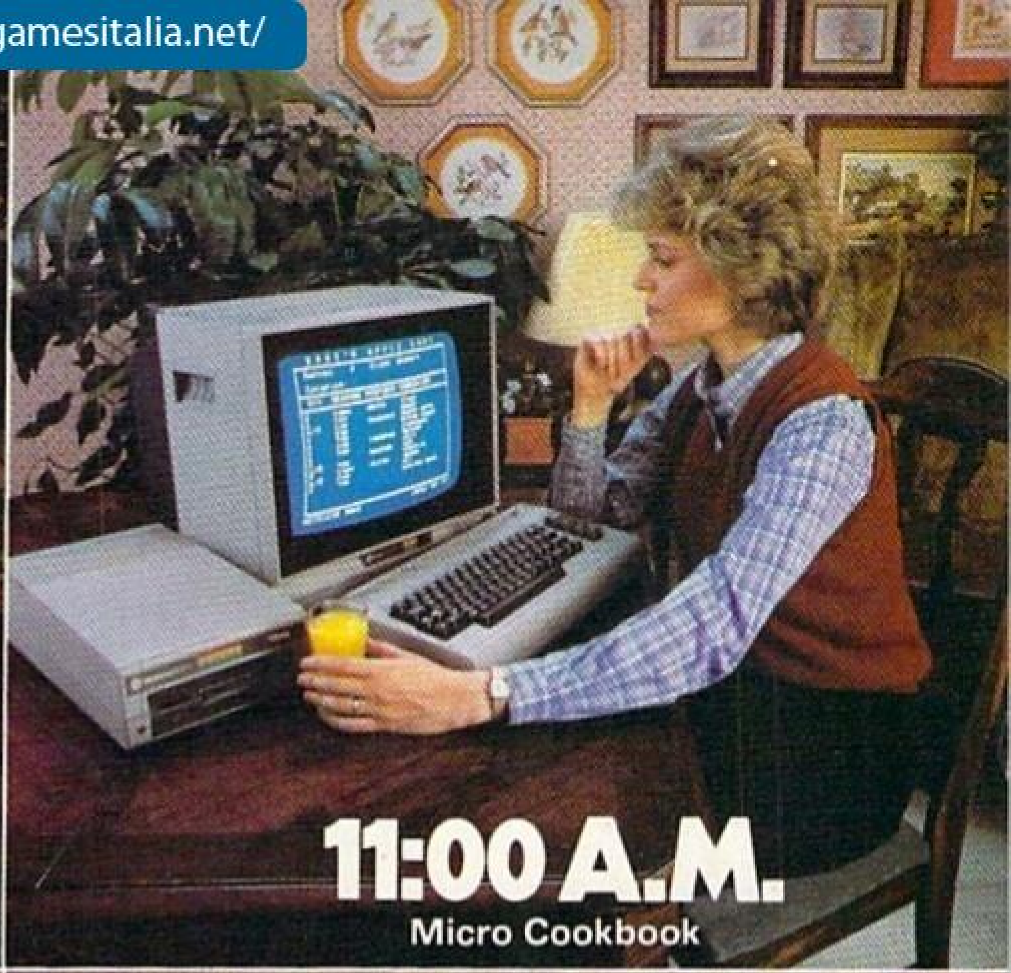


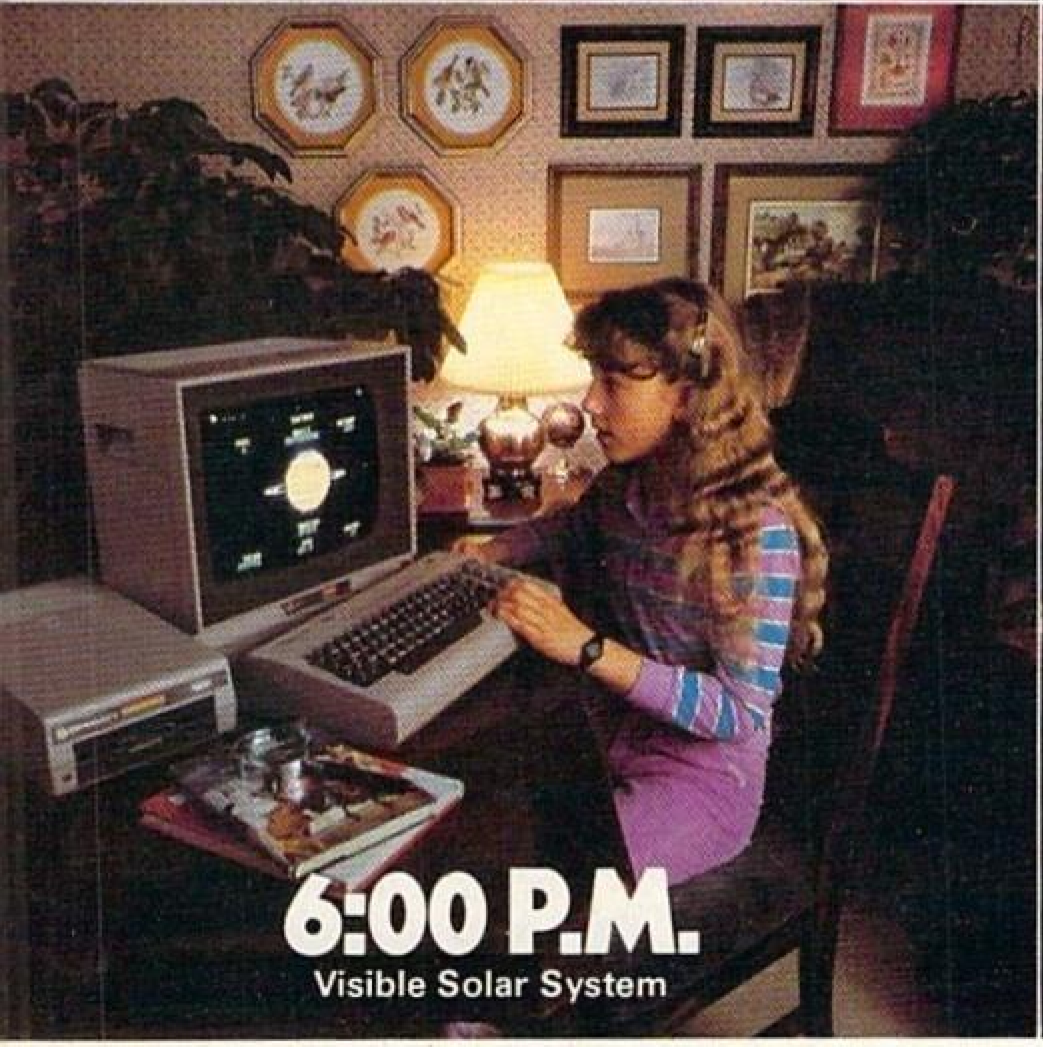
3:00 P.M.
International Soccer

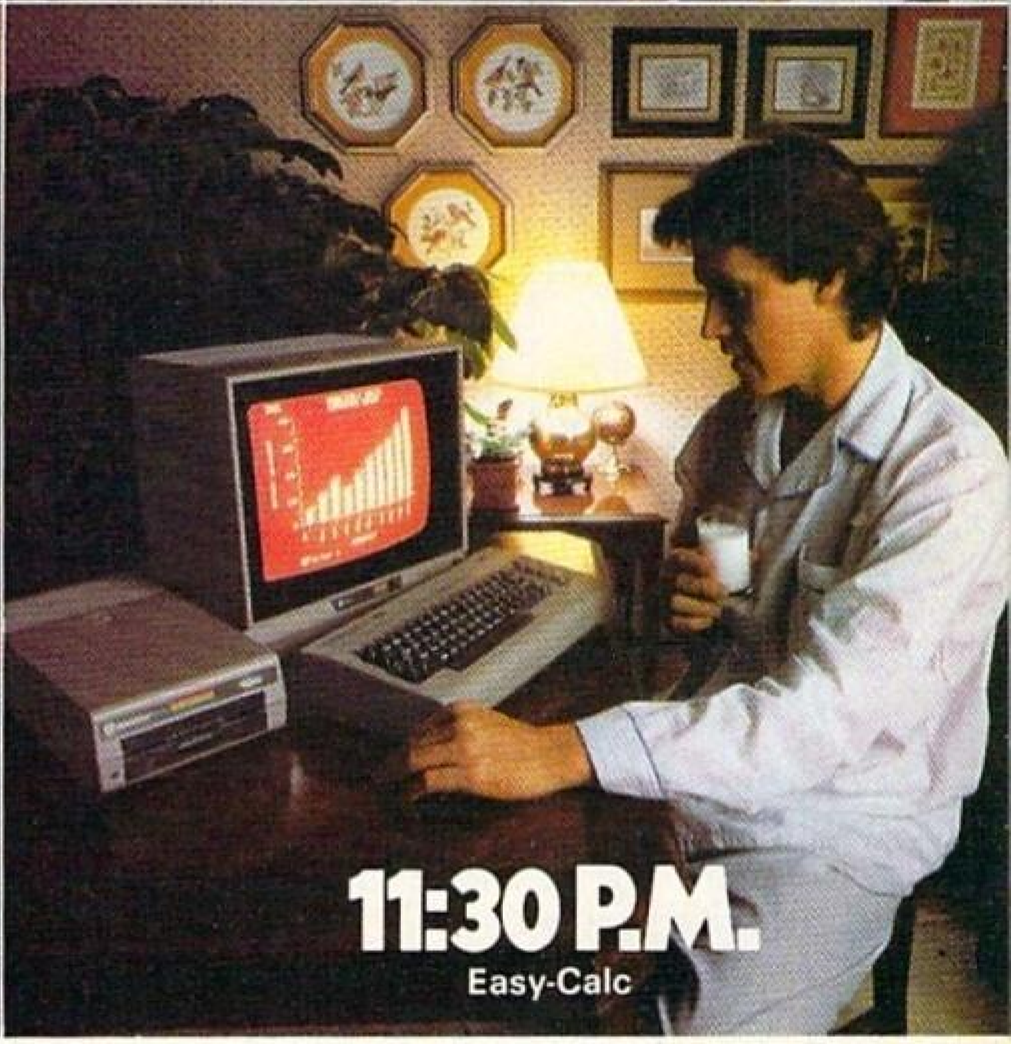
4:00 P.M.
The Manager

WE PROMISE YOU WON'T USE THE COMMODORE 64 MORE THAN 24 HOURS A DAY.


8:00 A.M.
Viduzzles


11:00 A.M.
Micro Cookbook


6:00 P.M.
Visible Solar System


11:30 P.M.
Easy-Calc

It's 6 a.m. Do you know where your husband is?

It's 8 a.m. Do you know where your daughter is?

It's 11 a.m. Do you know where you are?

We do.

We make the Commodore 64,™ the computer that's in more homes, businesses and schools than any other computer.

With its 64K memory, its high fidelity sound and its high resolution sprite graphics, it's one powerful computer. With its price—about one third that of the 64K IBM PCjr™ or the Apple IIe™—it's one affordable computer. (In fact, you can add a disk drive, a printer or a modem and get a powerful computing system for just about the price of those other computers alone.)

And with all the Commodore software programs we make for it, it's one useful computer.

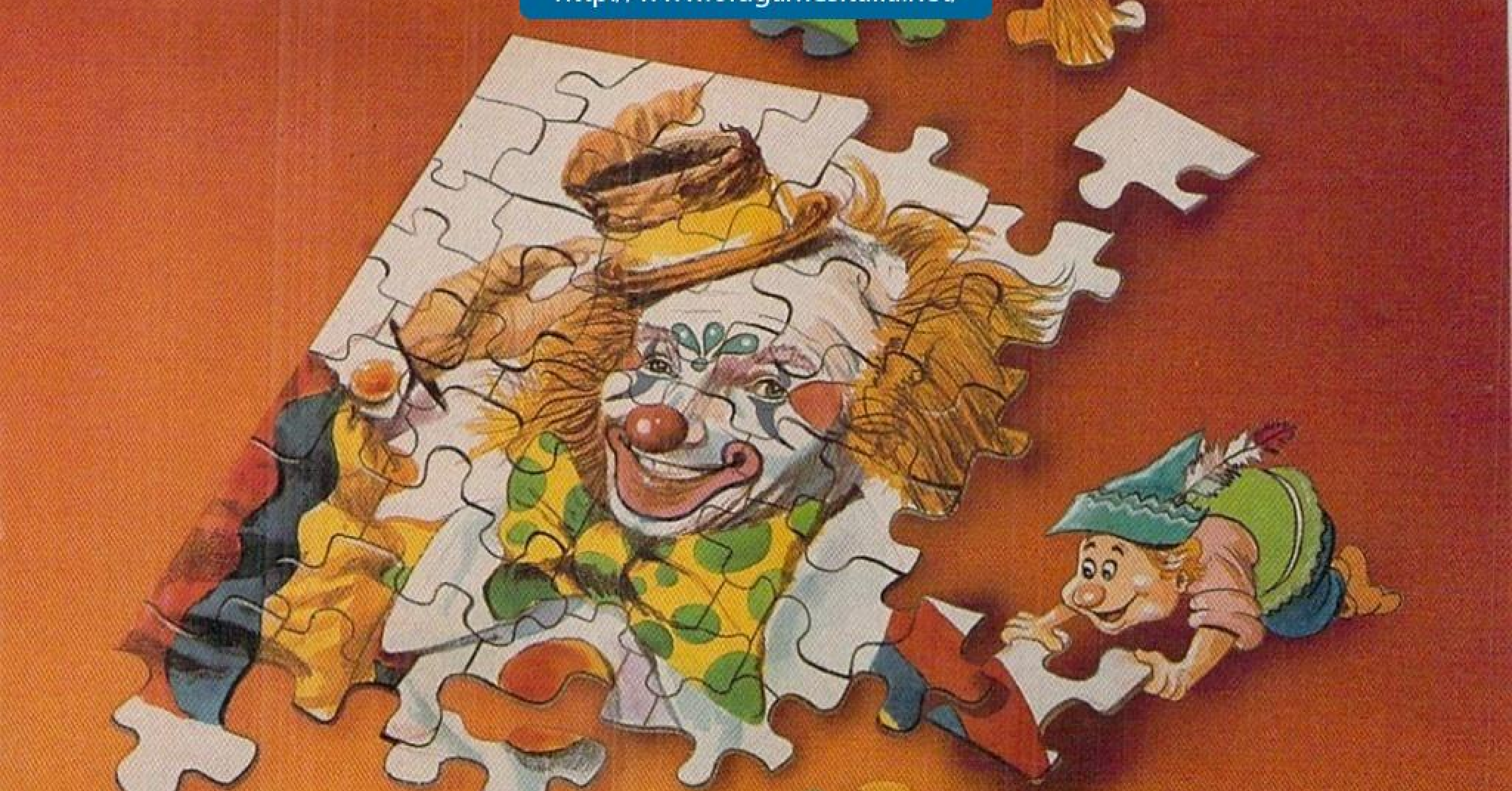
What can you use it for? Just about anything you want to. For fun or profit, for homework or housework, for higher game scores or higher S.A.T. scores, for words or music. For all hours of the day. And night.

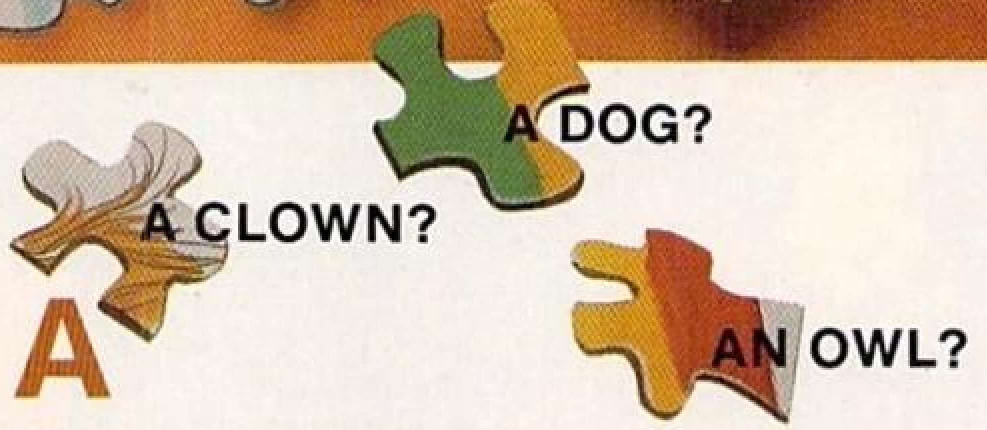
So if you're looking for a computer, it pays to look into the Commodore 64.

You'll definitely have enough money for it. Just make sure you have enough time for it.

COMMODORE 64

IT'S NOT HOW LITTLE IT COSTS,
IT'S HOW MUCH YOU GET.




A DOG?
A CLOWN?
AN OWL?

What's A VIDUZZLE?

If you guessed all three you're right! A VIDUZZLE is a jigsaw puzzle that you construct on your Commodore 64 screen.

Together with your puzzle building companion "VID," you'll race against the clock or a friend to complete these enjoyable puzzles. Use 25 or 50 pieces. Elect to build them with or without a jigsaw outline. You don't even have to worry about losing the pieces because they're all contained in an easy to use computer cartridge!

For those who are up to the ultimate puzzle building challenge, VIDUZZLES includes the solid blue VIDUZZLE. Trying to build this with 50 pieces and a jigsaw outline will put your puzzle building skill to the ultimate test! Patience and ingenuity are definitely an asset here if you ever hope to succeed.

Combine all of this with high resolution graphics and music and you've got a unique game for all ages. Ideal for children! The age old favorite of millions has come into the computer age, and it has a new name — VIDUZZLES!

Suggested
retail
29.95

COMMODORE

Recreational Software
Cartridge Based

VOLUME 4, NUMBER 3, ISSUE 15

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JUNE/JULY 1985

commodore power/play

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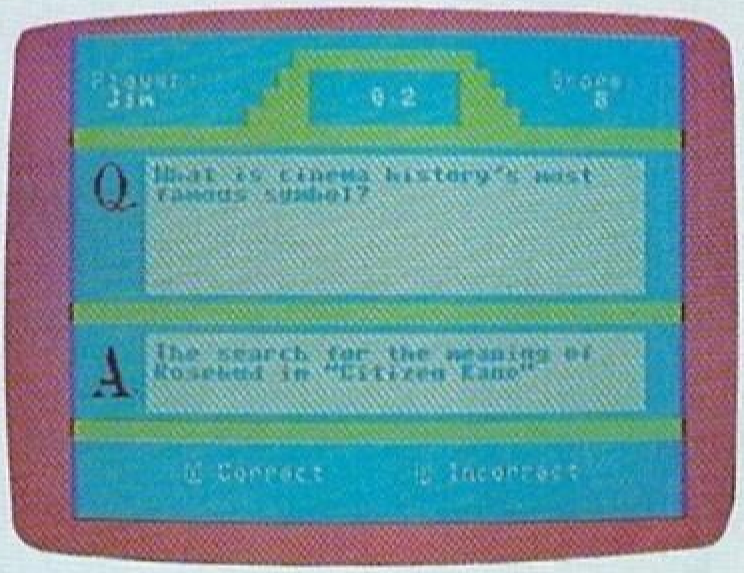

Player: Jim

0 2

Score 8

Q What is cinema history's most famous symbol?

A The search for the meaning of Rosebud in "Citizen Kane"

Correct

Incorrect

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Trivia games for the 64 pose some brain-wracking challenges for even the most avid fans. by Jim Gracely and John O'Brien

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WE'RE GLAD YOU ASKED

User Hotline

Compiled by Rick Gallagher, Commodore Customer Support

If you have a question about your Commodore equipment, call Commodore's Customer Support Hotline, toll free: 1-800-247-9000.

Q. Can the 64 handle a 1200-baud modem?

A. Yes, the 64 can handle a 1200-baud modem. Commodore will be releasing one shortly, the 1670. There are also third-party vendors that make 1200-baud modems.

Q. How can you find the beginning of BASIC?

A. To find the beginning of BASIC on the VIC 20, Commodore 64, Plus/4 or Commodore 16, you must type in:

```
?PEEK(43)+PEEK(44)*256
```

Q. I want to buy a Commodore 64 here in the U.S. to take abroad. Will this work out?

A. Commodore does not authorize or support taking U.S.-built machines overseas. This will void the warranty. The differences in voltage, TV systems and line frequency make conversion virtually impossible.

Q. I am having trouble loading programs with my 1541 disk drive when I use disks which I have had for a long period of time.

A. The problem you are experiencing may be caused by your disk drive being out of alignment. Check with a Commodore service center to have it tested.

Q. Is my Commodore 64 compatible with any disk drive other than my 1541?

A. The 64 can work with Commodore's 2031 and 4040 disk drives. These units require an interface from a third-party manufacturer. Also, there are third-party disk drives available that will work with the 64.

Q. Will the Commodore Plus/4 run Commodore 64 software?

A. Commodore 64 software will not run on the Plus/4. The Plus/4 has its own software available from Commodore.

Q. How can I interface my third-party printer to my Plus/4?

A. You must obtain a third-party serial interface.

Q. Can you save information on the datassette using the integrated software on the Plus/4?

A. No. The reason is that the integrated software defaults to the disk drive and cannot be altered.

Q. Why doesn't the Plus/4 do double quotation marks?

A. To get double quotation marks on the Plus/4, hit the shifted seven twice.

Q. How many records does the file manager hold in the Plus/4?

A. The file manager is able to process up to 999 records.

Q. Is there a CP/M option available for the Plus/4?

A. Commodore is not planning a CP/M option for the Plus/4.

Q. Why doesn't Commodore's 1526 printer do graphics?

A. The 1526 was designed as a correspondence-quality printer, not a graphics printer, but it will do *keyboard* graphics with no problem. Also, since the 1526 has one programmable character, it *is* possible to do a high-resolution screen dump, although it is rather slow. Check out the September/ October, 1984, issue of *Commodore Microcomputers* for a high-resolution screen dump program.

Just Can't Get Answers
to Your Questions on
Commodore Equipment?

Contact The Hotline
1-800-247-9000

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ATARI
APPLE 11e/c AND IBM PC

Imagine...

A WORD PROCESSING PROGRAM!
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ALL THREE PROGRAMS, ON ONE DISKETTE!, FOR ONLY $49.95*!

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"Russ Wetmore has done an EXCELLENT job! The program is flexible, powerful and very easy to use. $49.95 buys a heck of a lot of program."—REVIEW BY ARTHUR LEYENBERGER

"Performance: ★ ★ ★ ★ (Excellent) Value: ★ ★ ★ ★ (Excellent) This three-in-one package is a bargain . . . one of the finest values on the market."
FAMILY COMPUTING

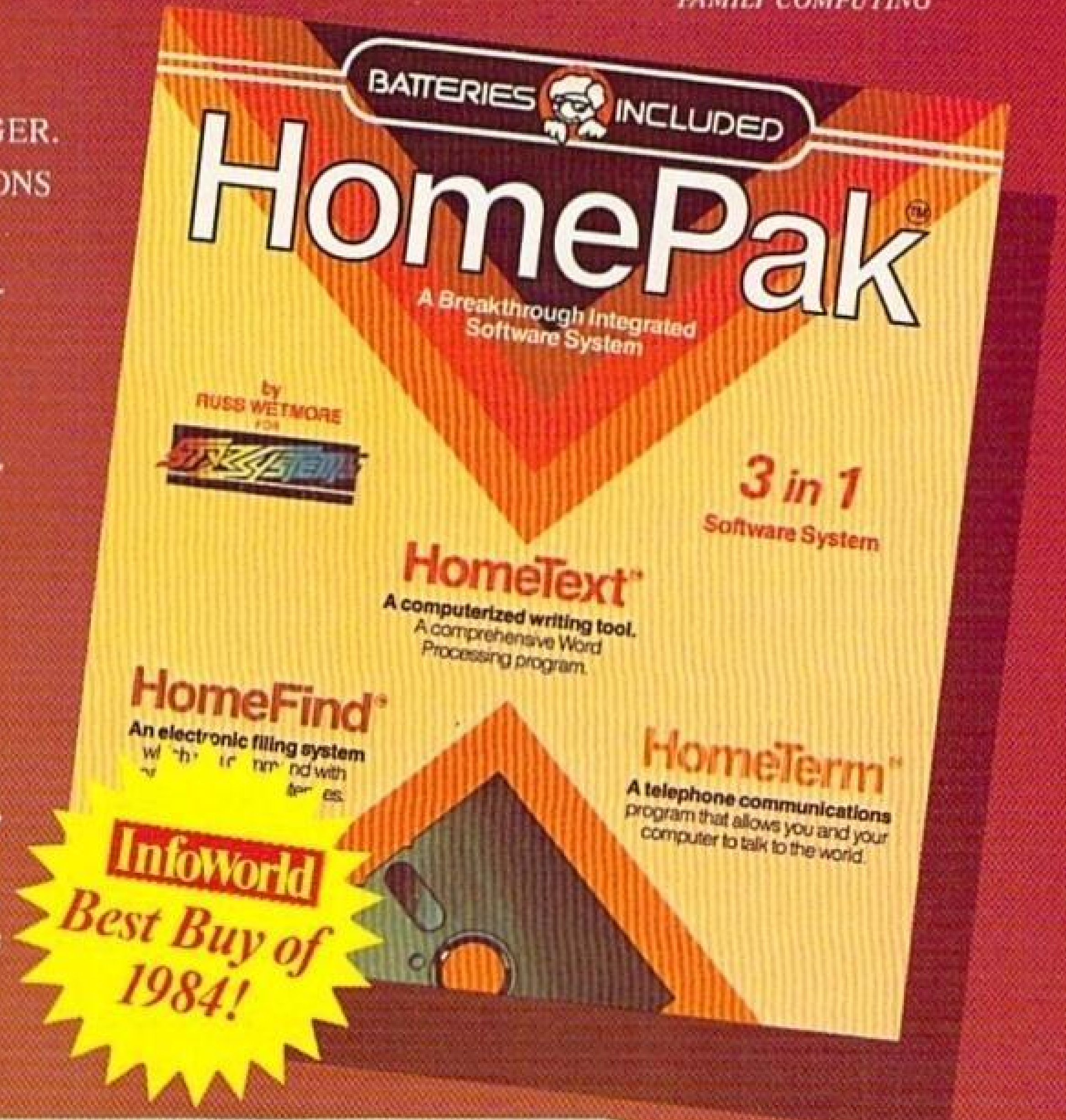
HOMETEXT WORD PROCESSOR.
HOMEFIND INFORMATION MANAGER.
HOMETERM TELECOMMUNICATIONS

Together they are **HomePak**: the three most important and most useful home computer applications in one integrated system — on one diskette!

The reviewers are unanimous: any one of these programs **alone** is well worth the price. So you're getting **three times the computing power**, with this exceptionally easy to use package:

- **all commands in simple English; no complex computer jargon, no obscure instructions**
- **all key commands are immediately available on the screen menu; additional commands can be called up for the more experienced user**
- **to help you, system status is displayed right on the screen**

And it's easy to use the three programs together. For example, in the "Merge" mode, you can take data stored in HOMEFIND and print letters and labels using **HOMETEXT**. Or, use **HOMETEXT** to write reports based on information you've called up via **HOMETERM**.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Circle Reader Service No. 4

POWER PLAY'S NEWS FROM THE FRONT

A Robot
In Every Home
An Introduction to Personal Robots
& Brand-Name Buyer's Guide
By Mike Higgins

Robot in Every Home

Personal robots will be the next technological marvel to be welcomed into our homes according to a new book titled, **A Robot in Every Home** published by Kensington Publishing (6300 Telegraph Avenue, Oakland, CA 94609).

Author Mike Higgins explains that home robots are already available for entertainment and educational uses. But this is just the start, he says. He predicts that robots will soon become widely used as companions, security guards and servants.

In his book, Higgins describes the evolution of personal robots, their present capabilities and their future potential. He also provides a brand-name buyer's guide to commercially available personal robots, with detailed descriptions of each model's characteristics and capabilities. Included is a resource section containing information about personal robot manufacturers, vendors, associations, books and periodicals.

The book is priced at $24.95 in hard cover and $14.95 in paperback.

Adventurer's Newsletter

You don't have to "look behind rock" to discover what's happening in the wide world of adventure games. **Questbusters**, a monthly newsletter devoted to this challenging form of entertainment software, offers timely in-depth reviews of all new releases.

Free ads in the "Swap Shop" and "Waiting for Duffy" departments allow readers to trade off old games and request help on difficult ones. And the winner of each issue's contest gets a free adventure or role-playing game.

All dedicated adventurers should "look wallet," then "send $15.00" for the next 12 issues (or a business-size SASE for a sample issue) to: Shay Addams, Questbusters, 202 Elgin Court, Wayne, PA 19087.

15-Minute BASIC

If you have been waiting for a quick and easy way to learn how to write BASIC computer programs, "15-Minute BASIC" may be just what you need. From Micro Logic Corporation (P.O. Box 174, 100 2nd Street, Hackensack, NJ 07602), Micro Chart #12 entitled "15-Minute BASIC" is a two-sided two-color 8-1/2" by 11" plastic card. It uses simple language and illustrations to get you programming fast. The card is for new owners of personal computers who want to write their own programs, BASIC instructors who want to recommend a preparatory text and managers who want to understand computers. The card assumes no programming knowledge and covers the fundamental statement types, variables, formulas, strings, arrays and functions. A companion card, Micro Chart #4, called "Algorithms" includes slightly more advanced BASIC programs. Micro Charts are available with a money-back guarantee for $5.95 each (plus $1.00 postage).

15 Minute BASIC

Learn BASIC in 15 minutes.

Music Playing Made Easier

One of the roadblocks in creating music on the Commodore 64 has been its keyboard, since it is designed for typing, not playing. This has made playing the 64 like a musical instrument in real time a cumbersome task. But now EnTech Software and Sequential Circuits have teamed up to make EnTech's **Studio 64** compatible with the Sequential Circuits keyboard.

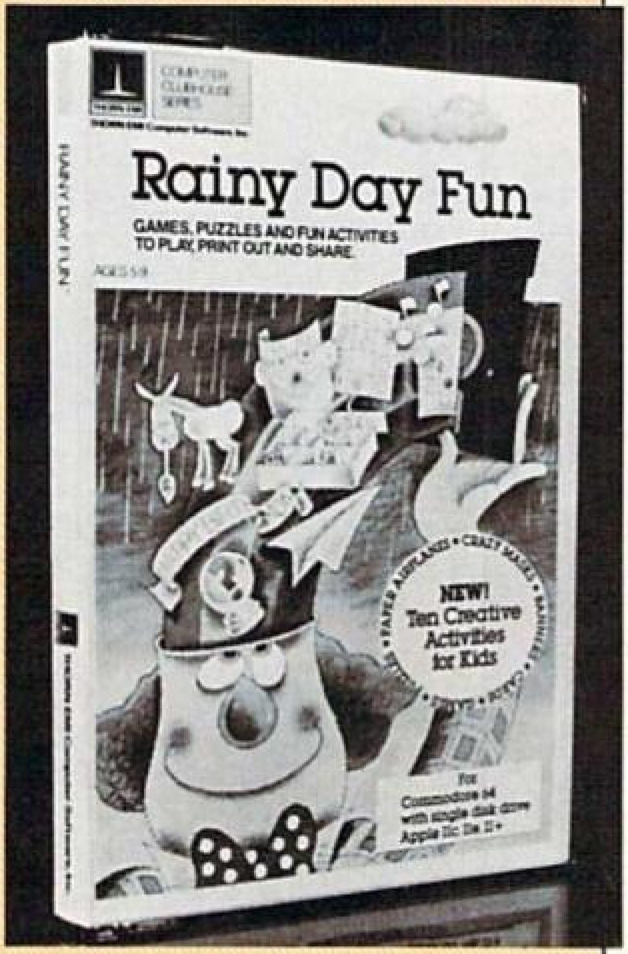
With the keyboard, Studio 64 turns into a three-track recording studio. Music for each of the three voices is played live and recorded in true musical notation. As a person plays one voice, the voices are played back at the same time. A built-in metronome uses a click track and changing border colors to help keep the musician on beat and the tempo can be adjusted to any of nine settings. An auto-correct function rounds off notes to the nearest sixteenth note, so even novice keyboard players play with precision.

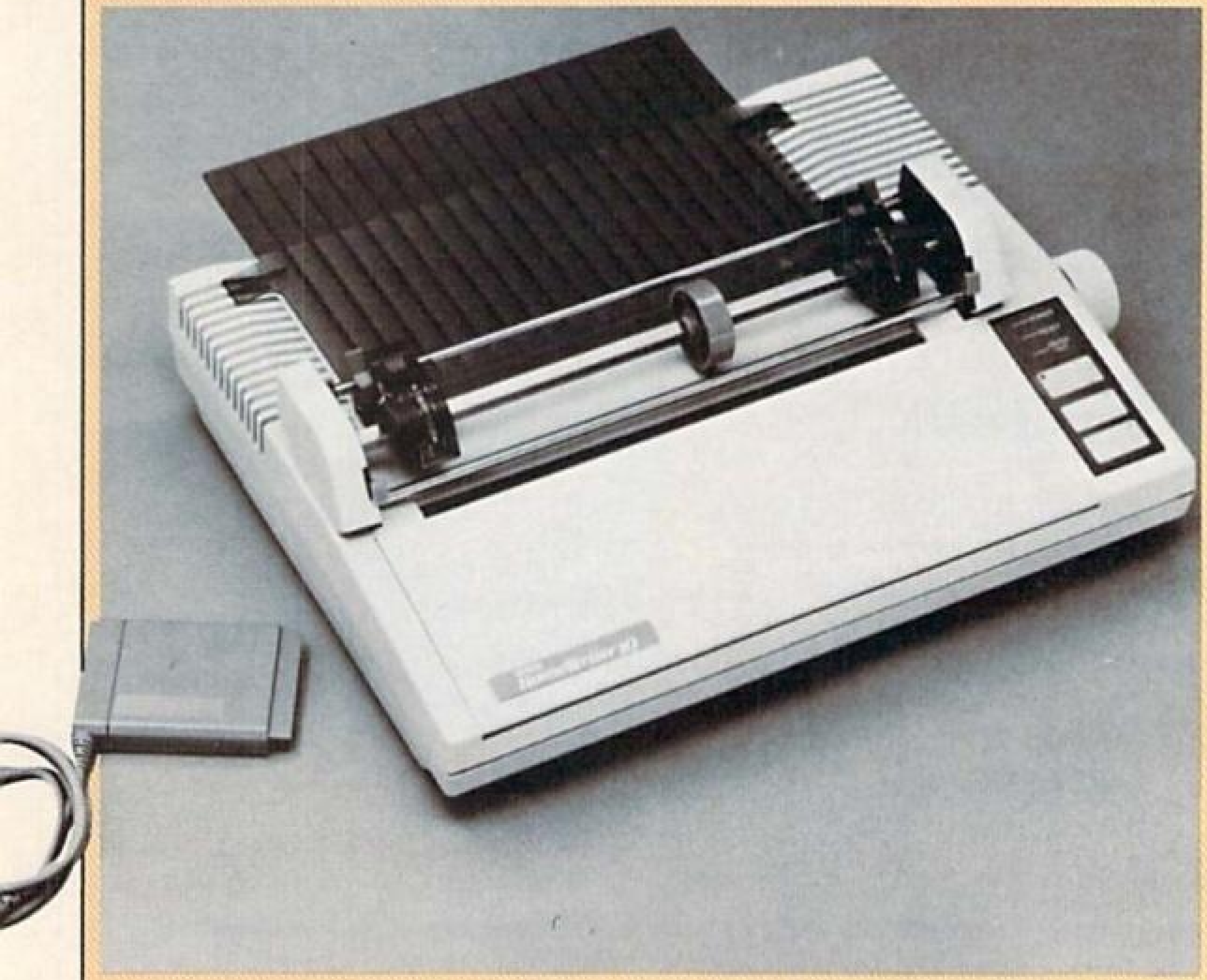
Versions for both the Commodore 64 keyboard and the Sequential Circuits keyboard are available on the same disk for $39.95. Current **Studio 64** users who want the updated version can send $10 and their old disk to EnTech Software, P.O. Box 185, Sun Valley, CA 91353.

POWER PLAY'S NEWS FROM THE FRONT

Rainy Day Fun

Rainy Day Fun, the first in the Computer Clubhouse Series from Thorn EMI Computer Software (3187 C Airway Avenue, Cost Mesa, CA 92626) turns your Commodore 64 into a clubhouse of activities for children ages five to nine. The program has ten educational, socially-oriented activities including Mask Maker, Paper Airplane, Pin the Tail on the Donkey, Connect the Dots, Party Invitation Maker, Sliding Puzzle, Banner Maker, Fortune Teller, Coloring Book and Mouse Maze. Seven of the activities utilize the printer. The program retails for $39.95.


COMPUTER CLUBHOUSE SERIES
Rainy Day Fun
GAMES, PUZZLES AND FUN ACTIVITIES TO PLAY, PRINT OUT AND SHARE
NEW! Ten Creative Activities for Kids
For Commodore 64 with single disk drive Apple IIc IIe II+



The HomeWriter 10 features a unique plug-in printer interface cartridge.

New Printer

The Epson HomeWriter 10 dot matrix printer features a unique plug-in printer interface cartridge (PIC), providing quick and easy compatibility with the Commodore 64. Tractor-feed and cut-sheet bin feeders are optional with friction-feed standard. The HomeWriter 10 is available through Epson printer dealers for a retail price of $269 for the printer and $60 for each PIC. Epson is headquartered at 2780 Lomita Boulevard, Torrance, CA 90505.

Windham Classics

Windham Classics, a division of Spinnaker Software (One Kendall Square, Cambridge, MA 02139), announces the release of its first two interactive computer adventure games for the Commodore 64—**Swiss Family Robinson** and **Below the Root**.

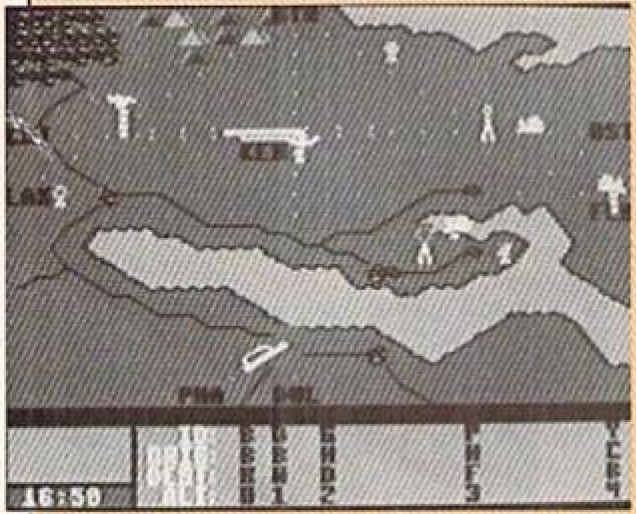
Designed for ages ten and up, Windham Classics brings literary masterpieces to life by letting players assume the role of the main characters, exploring the same environments and facing the same adventures. With high-resolution color graphics and friendly text interaction, these games introduce players to the best-loved stories of generations in a way never done before.

In **Swiss Family Robinson**, the player is Fritz, exploring the island environment of beaches, oak forest and coconut groves. Fritz's challenge is to keep his shipwrecked family alive, by responding to challenges with creativity and resourcefulness. **Swiss Family Robinson** offers the younger player a "help" key and a mapping system to make game play friendlier, as well as a **Guide to Nature** book containing clues to survival. A poster included in the package also helps players identify flora and fauna.

Below the Root is based on Zilpha Snyder's critically acclaimed **Green Sky Trilogy**. Recreating the **Trilogy's** vast and mysterious environment, **Below the Root** begins where the final book left off. The player chooses among five different characters—each with his or her own abilities and then sets off on a quest to find the secret of Green Sky, exploring its vast tree world and venturing below the root to probe its maze of mysterious tunnels. **Below the Root** combines the story-building aspects of a text adventure with hundreds of colorful graphics, excitement, and a text-menu—a first in adventure games. A map included in the package helps players find their way around Green Sky.

Both retail for $26.95.

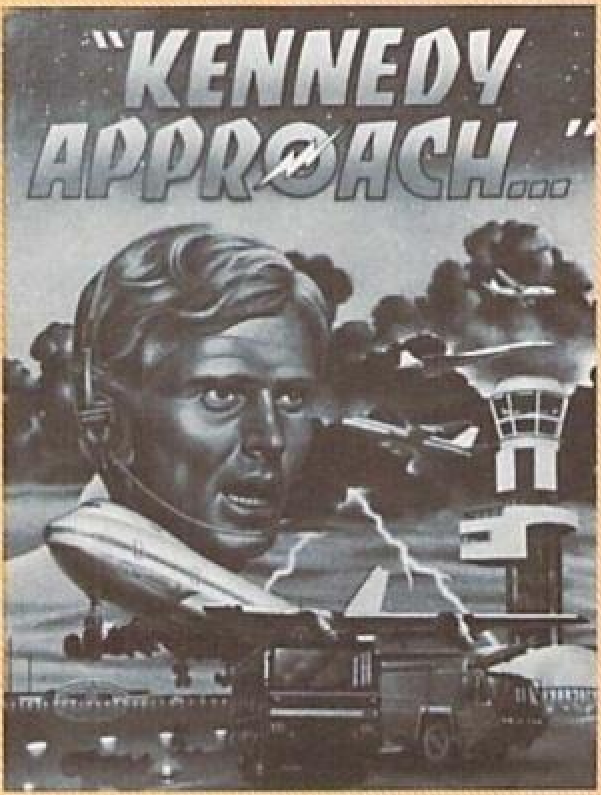
POWER PLAY'S NEWS FROM THE FRONT



Kennedy Approach is a flight simulator that features realistic speech.

Speaking Flight Simulation

Kennedy Approach by MicroProse Software (10616 Beaver Dam Road, Hunt Valley, MD 21030) is a simulation for the Commodore 64 that includes realistic, high quality speech. The Air Traffic Controller hears his instructions and the pilot's responses as radio messages are exchanged between ground control and jet airlines, private planes and the supersonic Concorde. The most important objective is to insure the safety of hundreds of passengers despite flight variables that provide ever-changing environments.


"KENNEDY APPROACH..."

SFD 1001 Disk Drive

Progressive Peripherals & Software (2186 South Holly, Denver, CO 80222) has acquired the exclusive North American marketing rights to the Commodore SFD 1001 disk drive, compatible with all Commodore business computers, using the IEEE-488 interface. The drive's capacity is the equivalent of about six 1541 floppies. A utility disk is included in 8250 format. An optional serial IEEE interface and cabling is also available so the drive can be used with the Commodore 64. The drive retails for $395.

Adventure Writing Contest

Electronic Arts (2755 Campus Drive, San Mateo, CA 94403) is sponsoring an adventure writing contest for all owners of their **Adventure Construction Set**. There are three $1,000 first prizes, one in each of three categories: fantasy, spy/mystery and science fiction. All entries are due by October 1, 1985 and winners will be announced December 1, 1985. To enter the contest, you must fill out an official entry form along with the owner registration card.

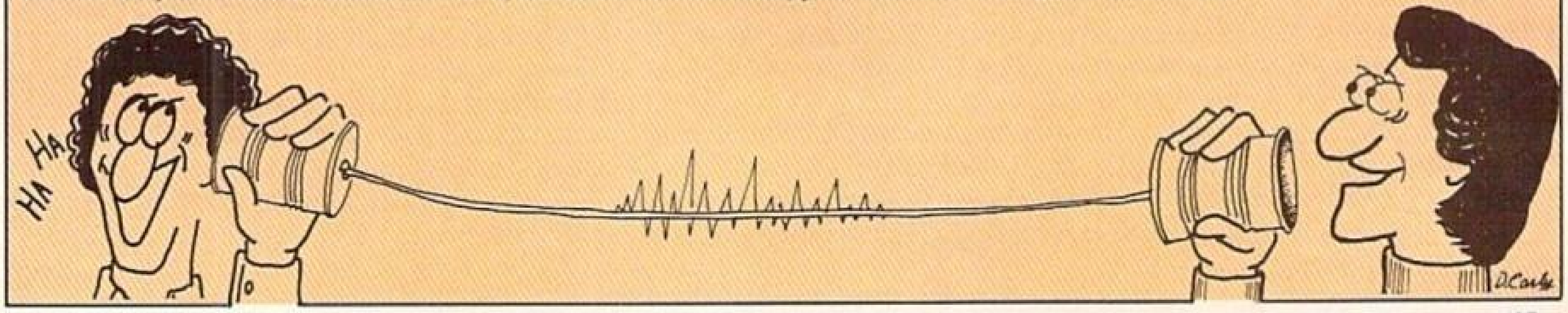
Mail Order Catalog of Computer Books

MRI Books has released the **1985 Mail Order Catalog of Computer Books**, a 150-page catalog offering books by 96 publishers, all available for discount prices and immediate delivery. The catalog contains 225 titles about Commodore computers and includes over 100 books on computer programming. Also listed are titles about office systems, word processing, telecommunications, computer graphics, data base systems, microprocessors, operation systems and integrated software. The catalog is available without charge from MRI Books, 230 West Glebe Road, Alexandria, VA 22305. Telephone requests to 703-549-5537 should be made between the hours of 9:30 A.M. and 4:00 P.M. Eastern time.

Comedy by Wire

Comedy by Wire is an on-line comedy newsletter created by Billiam Coronel, a professional stand-up comedian based in New York City. Each issue reports on overlooked news, stupid product reviews, unknown industry trends and superficial interviews with the seriously misinformed.

Comedy by Wire is available through The Source ("Public 153 Direct" at command level) and Delphi (Infomania section under Newsletters) telecommunications networks, and can be accessed using your Commodore computer and modem.



More News on page 127

SMART-START™

MAKES PROGRAMMING FUN AND EASY FOR EVERYONE!

Sound, graphics and other advanced features are what make the Commodore 64 as popular as it is. But these features can also require a lot more programming know-how than many Commodore owners care to learn. That's why MUSE® developed SMART START™ to harness the power of the Commodore and put it conveniently at your finger-tips.

Here are just a few of the things you can do with SMART START™.

- You don't need to be familiar with the Commodore keyboard, SMART START™ lets you quickly select all functions from pull-down menus with cursor or joystick.
- No need to type long instructions to LOAD, RUN, SAVE and CATALOG programs, with SMART START™ you press a single key.
- Easily design colorful graphics and exciting sound effects. SMART START™ automatically generates the BASIC code for use in your own programs.
- Keep track of time with an on-screen digital clock and alarm.
- Always just a keystroke away . . . works with any program you're running.
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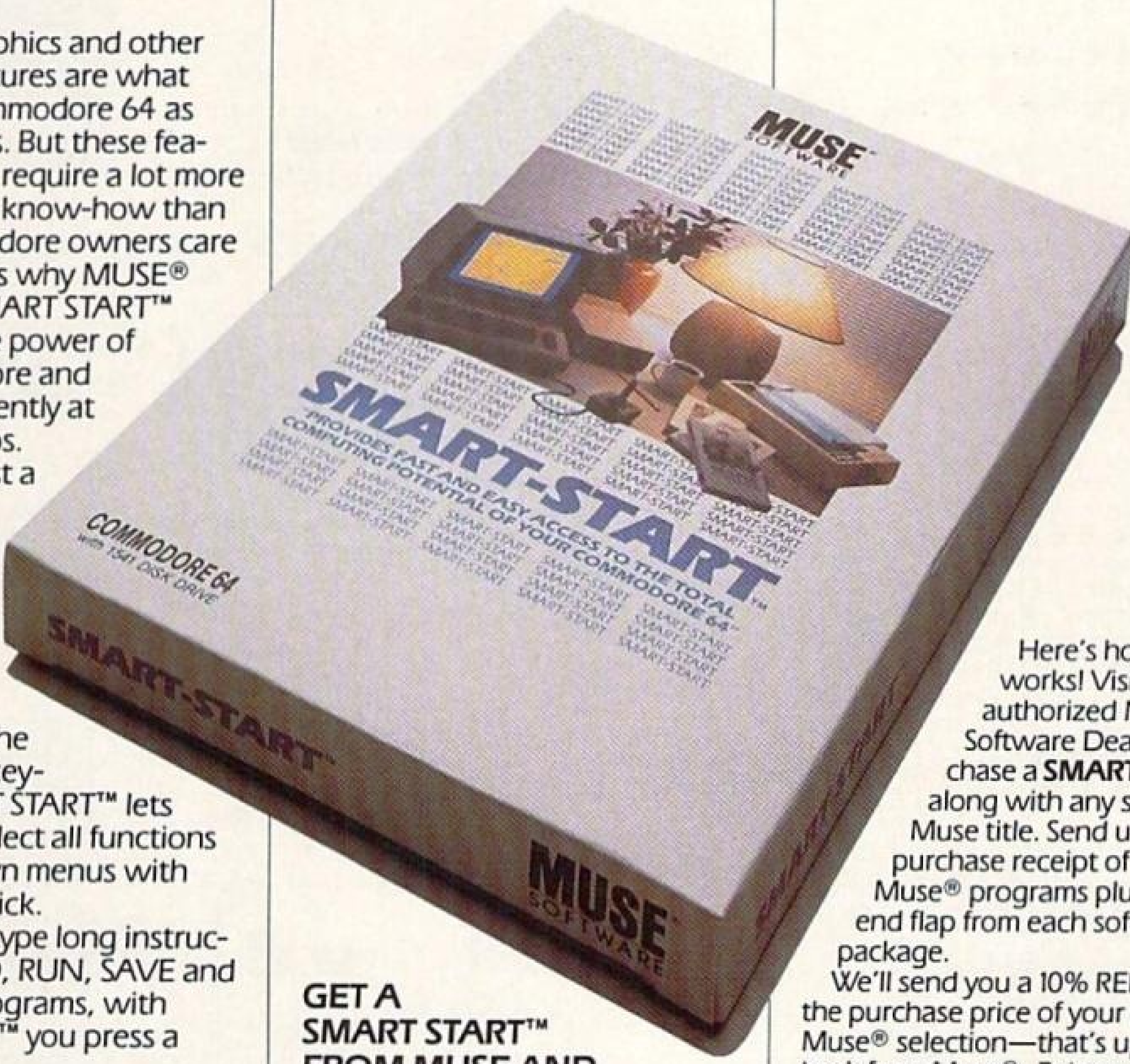
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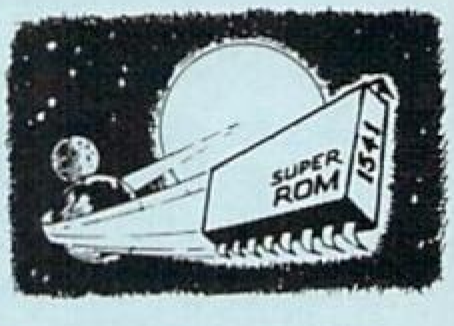

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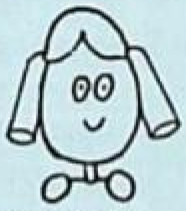

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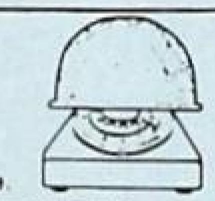

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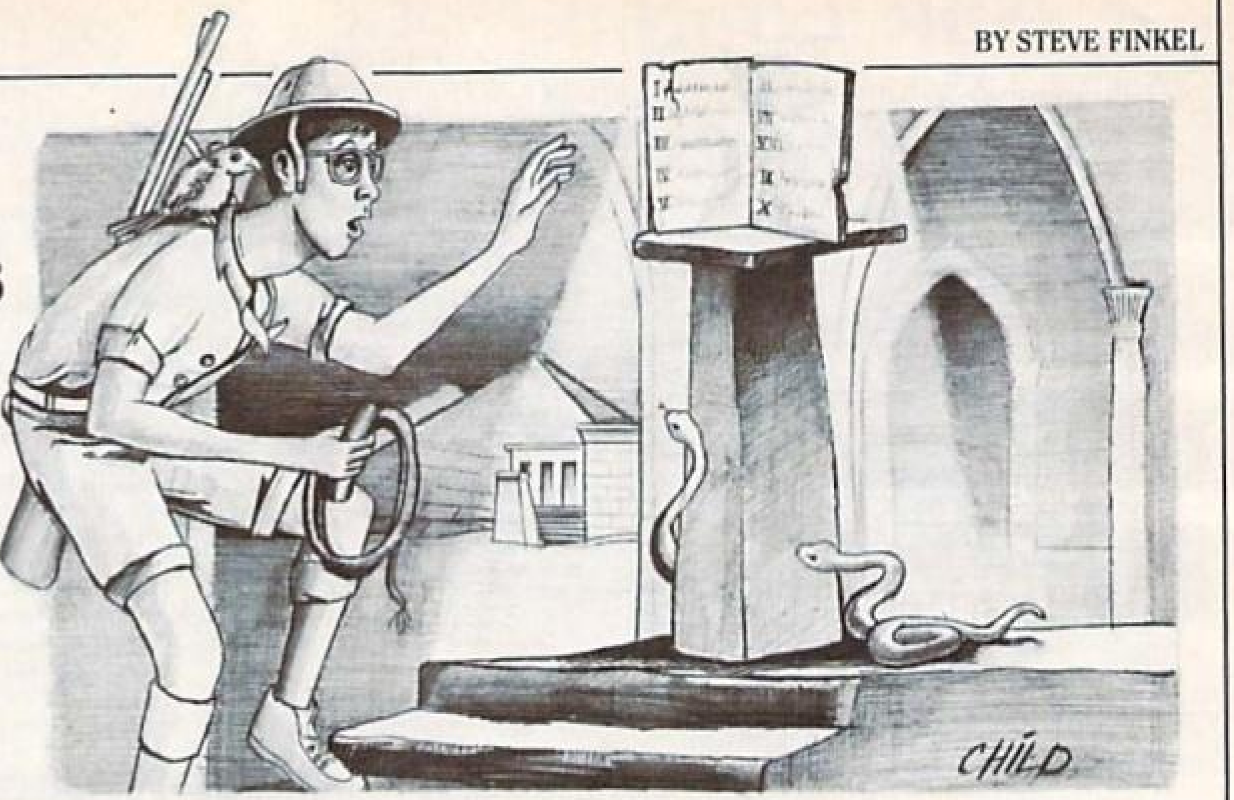
BY STEVE FINKEL

The Ten Commandments of Adventure Gaming



I. Never use a joystick.

Adventure games are also known as "text adventures." This is no mere coincidence. Text requires reading and writing, typing words, sentences, commands. Text does not require zigzag movements, quick reactions and a deadly accurate fire button. Still, if you are a hard-core joysticker, you might insist on trying a joystick with an adventure. My own experience has been that a joystick can, at best, produce lots of 2's, arrows and maybe a few d's on the screen.

II. Never play an adventure game with people watching.

Adventure games are very personal experiences...it is you who's tripping down the stairs, being ripped apart by wild animals or being exposed to nuclear radiation. Observers just don't understand and will, more often than not, yawn openly and ask if you wouldn't rather play a two-player game of *Wizard of Wor* or the like.

Corollary 1: Do not play an adventure game with people watching who know the game better than you. (It can be very embarrassing.)

Corollary 2: Do not play an adventure game with people watching who don't know the game better than you do. (Ditto.)

III. Never do anything faster than you have to while playing an adventure game.

Most arcade games place too great an emphasis on speed. The world around us is hectic enough as it is without increasing the flow of the ulcerous stomach juices by trying to beat a clock or race around a course.

Adventure gaming has a different type of excitement, one that does not lead a player to breathlessly concentrate on the screen, unaware that he or she is drooling all over themselves. You can type as s-l-o-w-l-y as you like; nothing bad happens, no points are lost, no bad guys catch you. After a few restfully-entered sentences, your blood pressure should go down ...until, of course, you encounter that first problem that you can't solve, but that's not in this commandment. Anyway, you can take all the time in the world in not solving it.

IV. Never make a map to keep track of the adventure.

There are several reasons that this is a bad idea. One is that you may be taking all of this too seriously. After all, the pen and paper effort you expend in making that map could probably be put to much better use in some sort of artistic sketch, literary creation, or even the report you have to have finished by tomorrow. Even if you do make the perfect map to help you keep track of where you are, you'll probably just end up losing the map. On a personal level, every time I try making a map, no matter what the game involves or the locales I traverse are, it always ends up looking like a map of New Jersey. It might help me find Camden, but not the treasure room. In addition, not having a map can provide you with a great excuse for miserable play in an adventure, particularly if you ignore Commandment II.

V. No matter how thoroughly you read the instructions for saving a game, something will go wrong.

There is an art to switching disks from the program disk to the save disk so you can store a game at a particular point of achievement. It is, of course, a lost art. The reason you save a a game is so you don't have to wander through corridors for six hours trying to find the troll room again. You try to build on your game, constantly moving forward by saving your place instead of being redundant. It's kind of like leaving a bookmark: once you've reached the point in a game where you want to stop, you save it at that place and pick it up again later. That's all well and good, but bookmarks don't have green and red flashing lights or 30 possible error messages, either.

Some common disk foul-ups:

Saving a game to the wrong disk "Oops, forgot to switch the game disk and the save disk in the drive! Maybe I can just take it out now and switch disks without hurting anything..." Maybe not.

Saving a game in the wrong area: You've already made it to the throneroom of the unreachable fortress and have dispatched the Emperor's crack guards and neutralized all of his spells. This game is saved at location C. Just for fun, you fool around at a much earlier point in the game trying to make something weird happen (see Commandment VIII) and decide to save the fruits of your labor to posi-

Continued on pg. 14

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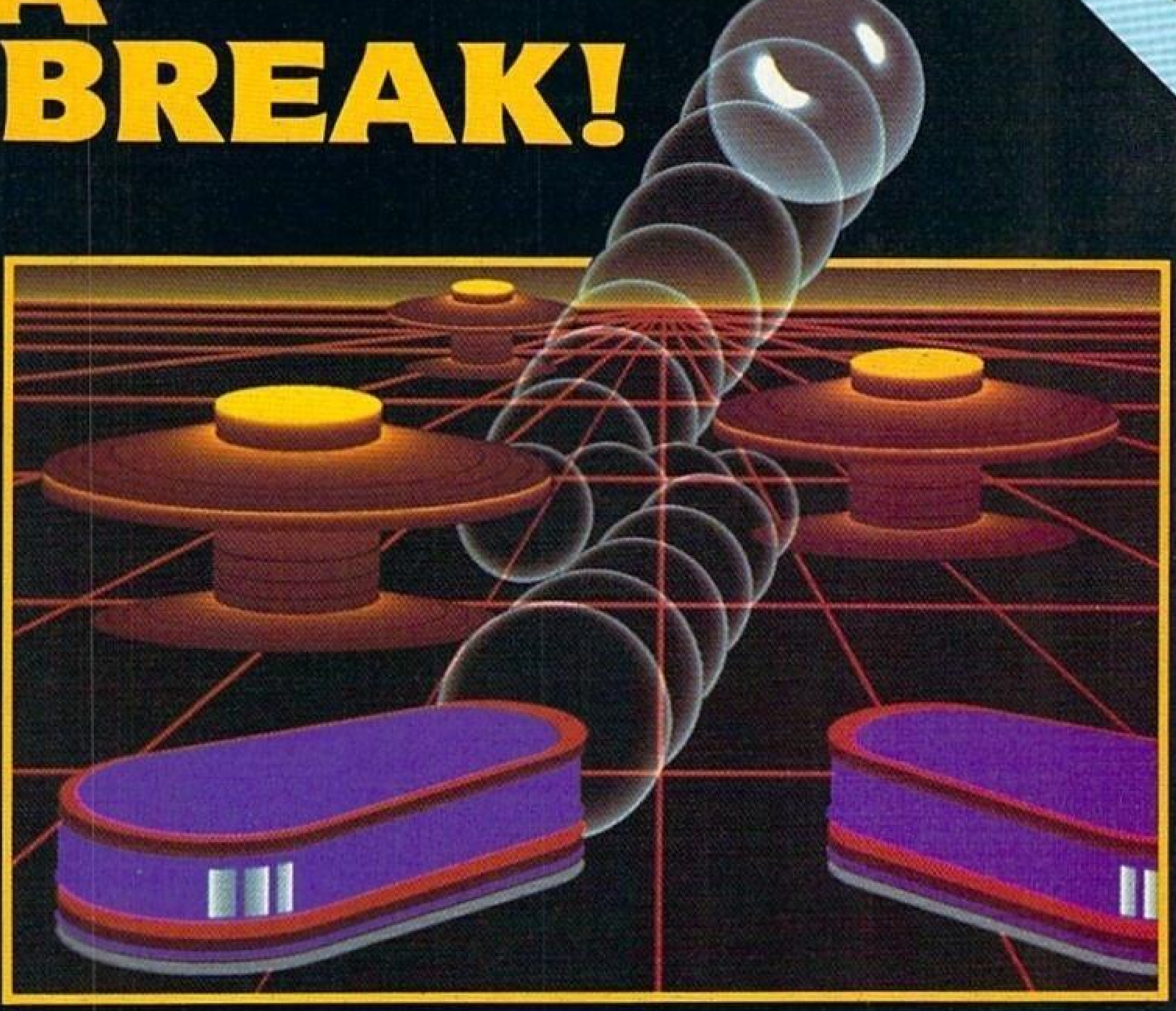

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tion D. Later, when you try to go back to the throne room by restoring the game from location C, you find yourself at the foot of the mountains that you have to scale to reach the impassable desert that you have to cross to get to the uncharted sea that you have to sail to enter the hostile lands where you must find the right bus to get to the castle, etc. At this point, you frantically check all other possible locations on the save disk, even though you know that you have inadvertently destroyed what you had been spending every waking hour of the last four months of your life working up to. Depression lasts until the holiday season.

Saving the wrong game entirely. This is actually pretty rare. Once, I had played *Zork* for a few hours. I saved the game without incident. Later, when I tried to restore the saved game, I found that I had actually saved *Hitchhiker's Guide to the Galaxy.* While this turn of events puzzled me briefly, I did recover to figure out how to get the Babel fish.

VI. Never "race" anybody to finish the game first.

This ties in with Commandment III. There are so many other enjoyable aspects of adventure gaming to concentrate on, why choose competition? If it's competitive gaming you thirst for, pick up the joystick and go wild. But in adventure gaming, you win when you solve puzzles and explore, and you lose when you don't solve puzzles and explore. Some view dying in a game as losing while others consider it winning.

Undesirable behavior patterns may develop when you race to finish. You might be tempted to try things like hiring a secretary to type for you at 65 words per minute. The quality of your play will certainly be affected. Where you might usually approach a problem with patience and resourcefulness, you may resort to being overly aggressive in your game play and life in general. Your behavior, focused intently on finishing first, may alienate friends and loved ones. Your sister Ruth will probably never speak to you again. See? Your single-minded pursuit of victory will have made you completely Ruthless.

VII. No matter how good your sense of direction is, you will always be disoriented.

Rudyard Kipling wrote, "East is East and West is West and never the twain shall meet." The same holds true for adventure gaming, whatever it means. Even when you use just the first letter of any direction to speed things up, directions always slow you down. If E, W, N and S weren't confusing enough, you can go in schizophrenic directions like northeast or southwest. If that weren't bad enough, sometimes they make you use port, starboard, fore and aft. (Those heartless Philistines!) No matter how well you try to follow the turns of corridors, you can never get to the door that's right in front of your face without at least one incorrect turn. Here are a few ideas for new directions that might change things a bit:

C (Cautiously): You're reluctant to try a tricky direction, fearing that it might cause you to walk off the cliff if you say southeast instead of northwest, so you just say WALK C ON LEDGE. Note: C also stands for "cowardly."

B (Behind): This should be used whenever you feel like you're being followed, have missed something particularly meaningful or if you want to hide. Additionally, it may be used as a put-down comment.

O (the most Obvious direction): If you have been trying to get to the door that is in front of your face for twenty minutes, at some point you should get the benefit of the doubt. Just say GO O TO DOOR, and you should be allowed to leave the room with some shred of dignity intact.

D (Divine guidance for the right way to go): When you are trapped in the maze of mazes and don't even know where to type anymore, let alone turn, just type GO D and you'll be instinctively guided in the right direction. After six hours of futility in some dungeon, you'll agree that this is an idea whose time has come.

VIII. Always try making something weird happen.

One of the best reasons for playing adventure games is that you can try anything and make some pretty strange things occur. You have a sword. Try swallowing it. You see a nest in a tree. Attack it? Dance in it? Talk to it.

If you are willing to do bizarre things (consider that you've already spent four months of your life trying to figure the game out, which is pretty bizarre in itself), you can make some entirely unique things happen. One of the most rewarding things that ever happened to me was learning how they get toothpaste to come out of the tube with different color stripes, and I never would have learned that if I hadn't been willing to eat a computer console in the dark of an out-of-control spacecraft. Don't try to figure it out; just sit back and enjoy it!

IX. The easiest problem you can't solve is the one you mention to anyone you consider stupid who'll know the answer without even thinking.

Again, this ties in with Commandment II, but is more embarrassing. When you reach the end of your rope in dealing with a puzzling obstacle, you want to consult someone. Instead of telling someone you hold in respect (out of fear that they'll think you are dense or incapable of logical thought), you tell someone you consider to be the intellectual subordinate of a small eggplant. What's worse is that they know you consider them none-too-swift.

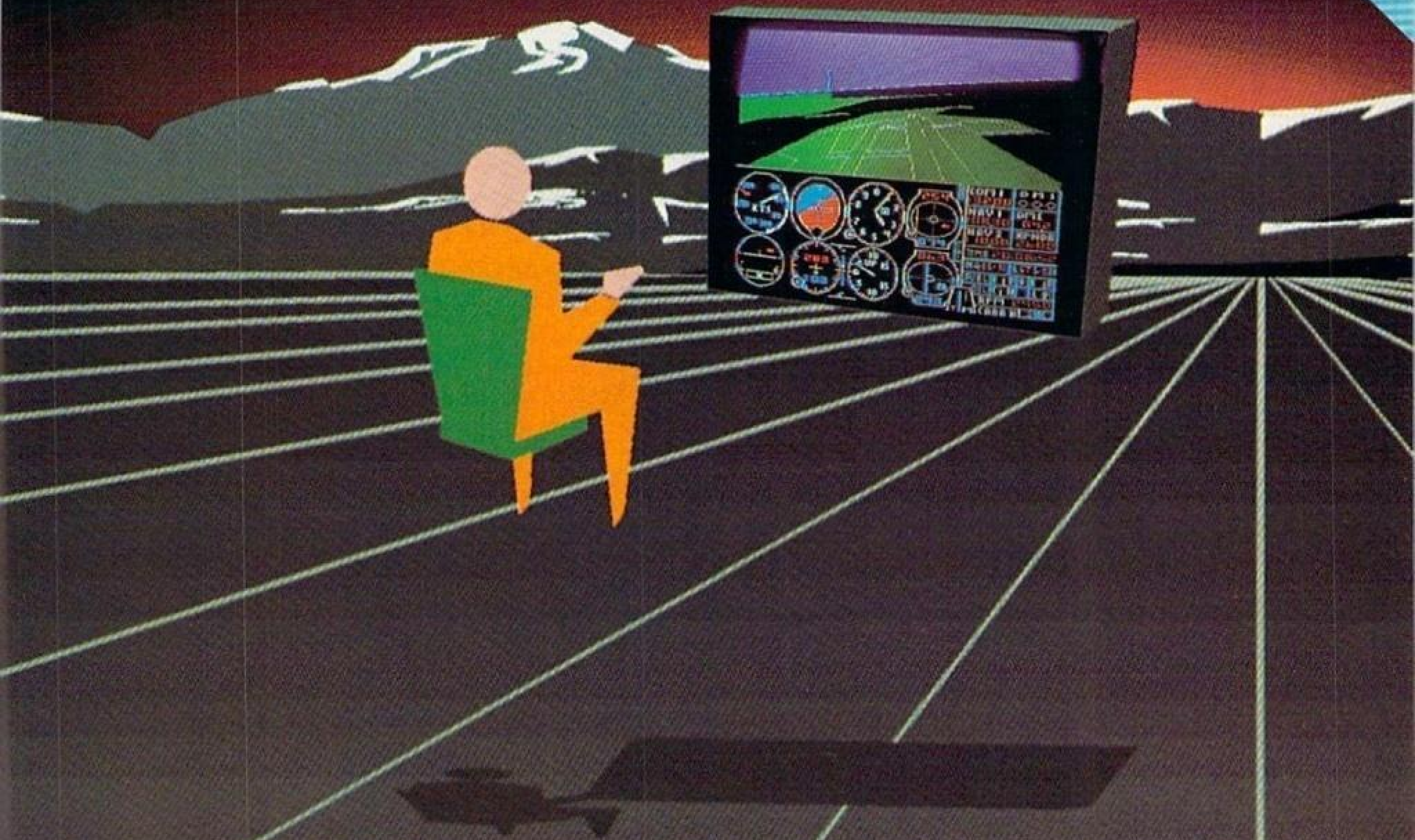
As soon as you finish describing the stumper that's haunted you even in your dreams, they just laugh and say "That's easy!" and proceed to detail the obvious solution. Embarrassed, you can only mumble in stunned response, barely able to hold back the tears of humiliation and anger. After all, if you were wrong about THAT turkey, couldn't you be wrong about other things as well?!

X. When all looks hopeless, save the game and then go on a rampage.

Do it! You'll probably screw up everything you've accomplished in the game, but you'll feel great. ◼

For Commodore 64™ Computers

Flight Simulator II



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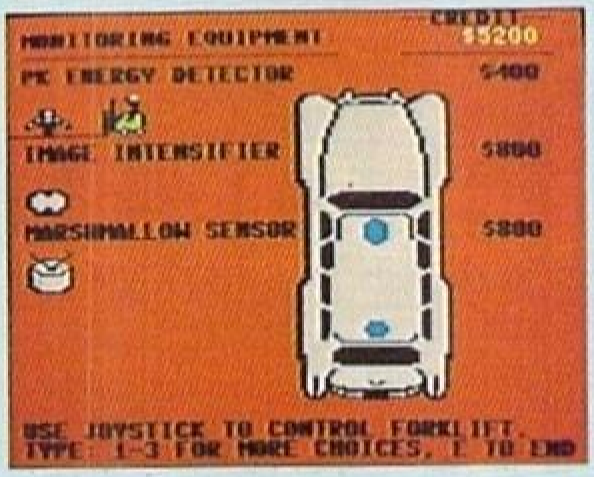
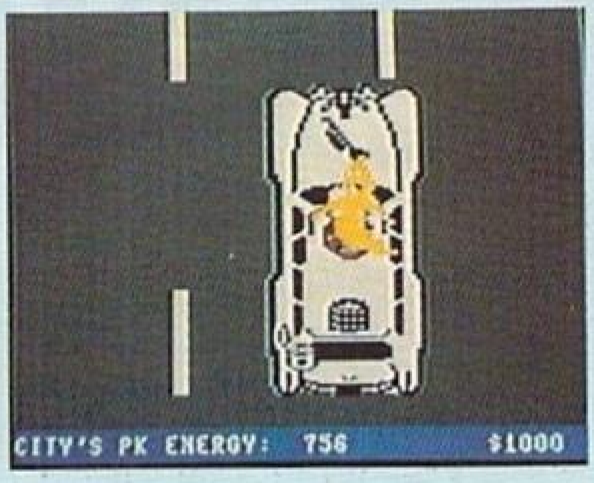
REVIEWED BY MARK COTONE

Ghostbusters

Computer: Commodore 64
Publisher: Activision
2350 Bayshore Frontage Road
Mountain View, CA 94043
Medium: Disk

When *Ghostbusters* hit the stands as the first video game based on the Columbia Pictures mega-hit, I must say that even though I was interested, I was also skeptical. But I soon discovered that if you want an intense challenge, an action-packed contest, a battle that combines both heroics and humor, I can wholeheartedly tell you who you gonna call.





If you want an intense challenge, an action-packed contest, a battle that combines both heroics and humor, I can whole-heartedly tell you who you gonna call.

As far as play mechanics go, *Ghostbusters* follows the theme and plot of its silver screen counterpart. A city is being overrun by an assortment of menacing spirits, all winging their way to Zuul's temple, a centrally-located skyscraper which has been converted into a demonic rendezvous for all forces wishing to send the earth to its flaming finale. You, with two friendly workmates and a $10,000 bank loan, have opened a Ghostbuster franchise. Your objectives are two-fold. First, you must save the world by capturing and containing the urban apparitions. Then, since good intentions alone will not pay the bills, you must also save your business, a feat accomplished by turning over a monetary profit by game's end.

Following a logical progression of events, the contest has been divided into three segments. To start, you'll be required to pick up some wheels off a used car lot and outfit it with your choice of futuristic equipment. Then it's on to the Ghostbusting phase, which itself uses a trio of high-resolution screens.

An initial map of the threatened metropolis is where you plan your offensive, plotting the quickest path to any buildings under spiritual siege. Then you hit the streets, where you traverse your designed route, steering your car from a bird's eye perspective while trying to vacuum up any ghosts (Roamers) that you might have immobilized. Finally, when you reach the disturbance, a front view of the building in question appears, where your assignment is now to corral and snare a small green spud-of-a-specter called a "Slimer."

Each successful trapping earns you cash, while each escapee raises the unearthly "PK" energy that the temple is generating. The higher this measurement, the tougher your job becomes. The Roamers will shift into second gear and Slimers will invade quicker. At PK 5500, the infamous Marshmallow Man arrives, ready to crush thousands of dollars worth of city structures unless baited and destroyed.

Play continues—mapping, cruising and busting—until the PK level reaches 10,000. Then the bank will step in with your entrepreneur report card. If you have failed, the computer will give you the stormy rundown. The financial dilemma is outlined in dollars and cents, then, with a splash of eerie laughter, the program dismisses you. On the other hand, if you were efficient enough to present a positive profit margin, you are rewarded by gaining admission to the final segment of the challenge.

Here, situated at the base of Zuul's skyscraper, you must now sneak two of your cohorts into the hellish temple, an unpretentious task were it not for the ten-story marshmallow monstrosity prancing around the entrance, wanting nothing more than to make you a permanent stain on the blacktop. Get your team members flattened and the party is over.

But if you can negotiate and infiltrate, you will be the proud spectator of a well-deserved rooftop negative ionizer exorcism—a true buster's dream.

Ghostbusters, an exciting contest that tests the mind and body, is a special game for another reason. Activision's president, Jim Levy, has always been adamant about his intentions of basing his games only on in-house, original ideas. This latest endeavor, their first licensing, put their reputation on a precarious line. Anything short of brilliance could have jolted them off of their elite pedestal of quality.

But, alas, Mr. Levy need not worry. From the opening follow-the-bouncing-ball sing-along theme song to the synthesized yelps of, "He slimed me," as a green goblin flees, *Ghostbusters* is a sure crowd pleaser.

The former failures of movie-licensed video games are simply skeletons in competitors' closets, the bony remains of which can readily spook any prospective buyer. But accomplishments like this, showing the pride and class of a designing staff, now allow players to stare down the past, lingering phantoms of half-baked opportunism and chime in with the rest of America in saying, "I ain't 'fraid of no ghost!"

HAUNT HUNT HINTS

As the game commences and it's time to equip your car, don't be stingy. Your initial impulse will be to save some cash to use as a financial foundation. But it's better to invest most of your money in some early options. They, in turn, will help you search and bust, and more often than not, assist you in raising cash.

When mapping your path around the city, if no building is in immediate danger and you're passing near your headquarters, stop in and replenish your supplies. The ghost migration is suspended when you are engaged in any of the other phases. So even if your equipment isn't totally depleted, a pit stop can only be advantageous.

When you switch to the driving phase, keep your vehicle in the center line. This will give you the best chance of moving to either side to suck some spirits into your vacuum.

I've developed a Slimer-seizing technique that you might find helpful during the third segment of the busting phase. (This might sound a bit confusing to the uninitiated, but will fall into place once you have played the game.) This is the screen where your ghost trap is placed between your crew of two, each geared with a negative ionizer backpack.

Even though Activision's documentation instructs you to power your backpacks as soon as your Ghostbusters are positioned, relax and wait a few seconds. The green Slimer usually dances around momentarily, then slides all the way right, then down. When the spirit drops, throw on your ionizer, move left and quickly spring the trap. This method allows you to wait for the correct capturing position, while economizing ionizer energy.

If you're deft enough to make it to the game's final phase, the segment where you must sneak your men past the "monolith of marshmallow monstrosity," don't be intimidated. Move your surrogate to the screen's center, directly below the temple portal. Take note of the marshmallow's springing pattern. As he leaps skyward, wait until he kicks his leg out. This is your opening. With a little practice, you can consistently push your men through and raid Zuul's rooftop. C

REVIEWED BY TOM BENFORD

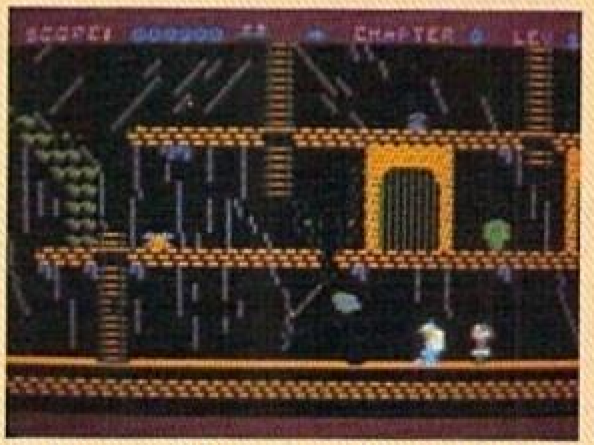
Whistler's Brother

Computer: Commodore 64
Publisher: Broderbund Software
17 Paul Drive
San Rafael, CA 94903
Medium: Disk

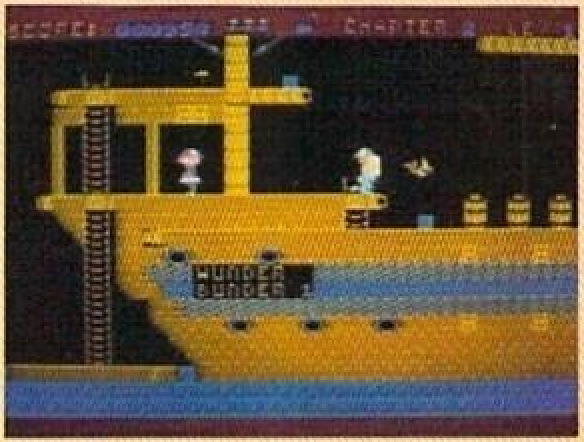
The principal characters in Broderbund's *Whistler's Brother* are Professor Fenton Q. Fogbank, represented by a "cutesy," but absent-minded little character in a pith helmet, and his more-together brother, played by you. The really novel twist of the game is that you control not only your own surrogate character on the screen, but the professor as well. By pressing the fire button on the joystick, your character whistles so the nutty professor will follow. Strategy and timing are integral requirements of this game, since failing to time a whistle will have your nerd brother going off in the wrong direction, possibly getting killed. (And you know your mom wouldn't like that.)

The plot goes like this: Your brother (the professor) holds a doctorate degree in archeology and is on the faculty of a prestigious university. You, on the other hand, spent your college years learning how to sufi dance from a whirling dervish and concerned yourself with metaphysical matters. Your brother recently returned from a year-long research expedition into the rain forests of South America, funded and equipped entirely by the university. When he returned, not only did he forget his manuscript notes, but the university's "dig" equipment and artifacts as well. The college wasn't too happy about that, to say the least, and you and your brother have to retrace his steps over the past year to collect the manuscript, artifacts and tools he left behind. The stage is set, and thus our adventure begins.

The game's story has 13 chapters (levels). Chapter 1 starts at the beginning—going to the pier to board the ship bound for South America. You have your hands full keeping reins on your wandering oglethorpe sibling, collecting tools and artifacts and completing this jaunt through a construction site on the way to the pier. On each successive level, you'll find tools or artifacts which, when collected, impart a special power. You'll also have the ability to fend off arrows, pesky pelicans and the like, in addition to creating stepping places where none exist by using your special powers.



The really novel twist of the game is that you control not only your own surrogate character, but the professor as well.



The game's animation and graphics are superb, in keeping with Broderbund's usual level of excellence. The sound effects and musical accompaniments are also noteworthy and the play-action is demanding. Since you have to control your own character *and* keep an eye on and control the brother character as well, it definitely takes a bit of getting used to.

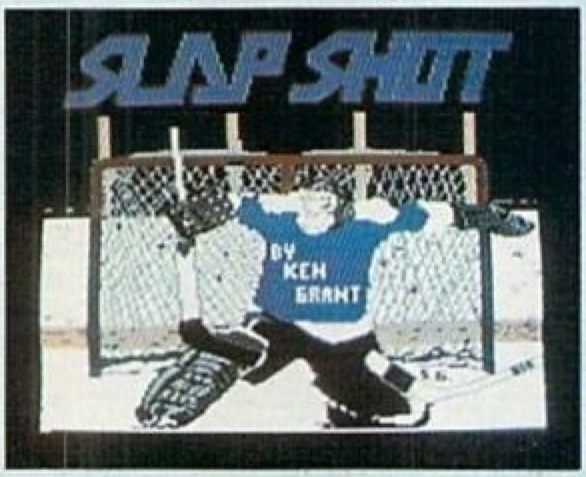
Each chapter has its own intricacies, idiosyncracies, dangers and strategies, so *Whistler's Brother* will sustain your interest for a long, long time. It's not a game you're going to master in an hour—or ten, for that matter. C

REVIEWED BY TED SALAMONE

Slap Shot Hockey

Computer: Commodore 64
Publisher: Artworx Software
Company
150 North Main Street
Fairport, NY 14450
Medium: Disk

A head-to-head two-player challenge on ice, Slap Shot's *pressbox view of the rink makes puck control, passing and bodychecks as easy as falling down.*



The crowd goes wild! Orr's got a quick breakaway from center ice with nobody but the goalie between him and the winning score. Just look at that great stickhandling. There's the shot; it's fast and high. Is it? Yes! Bobby's broken the tie with a mere two seconds left in the final period. Amazing, simply amazing.

And so it goes with *Slap Shot Hockey* from Artworx. Their newest release may well become the *International Soccer* of 1985. After all, it features excellent graphics, stunningly realistic animation, fluid control and clear speech synthesis. With all that, how can it miss?

Slap Shot is a head-to-head two-player challenge on ice. The pressbox view of the rink makes puck control, passing and bodychecks as easy as falling down. Players choose from six world-class teams (Canada, U.S.A., the Soviet Union, Czechoslovakia, Sweden and West Germany). Once selected, a brief rendition of the appropriate national anthem rings out.

That leaves just enough time to sharpen your skates before the teams file onto the ice for three two-minute periods full of action, excitement and energy. Each player has direct control over the squad member closest to the puck, a setup which facilitates passing and puck control. A word of warning: The computer-directed defense is tough at any game speed.

The team members move so authentically you'd think that they were actually skating. Players celebrate a score by throwing their hands high in the air as they coast to a stop, just like their real-life counterparts. If frustration mounts because the puck is continually stolen from you, deliver a savage bodycheck. It's guaranteed to make the recipient a saddlebrained, star-gazing sack of potatoes for a few seconds. Be careful, though, because too many against one player (or someone without the puck) may result in a penalty assessment. Then it's faceoff time by your net, a situation you want to avoid like the plague.

Besides the graphically realistic squads, there's a veritable host of spectators: each one clapping, whistling and cheering their heroes on to ultimate victory. The animated, involved crowd really gives the players a psychological boost.

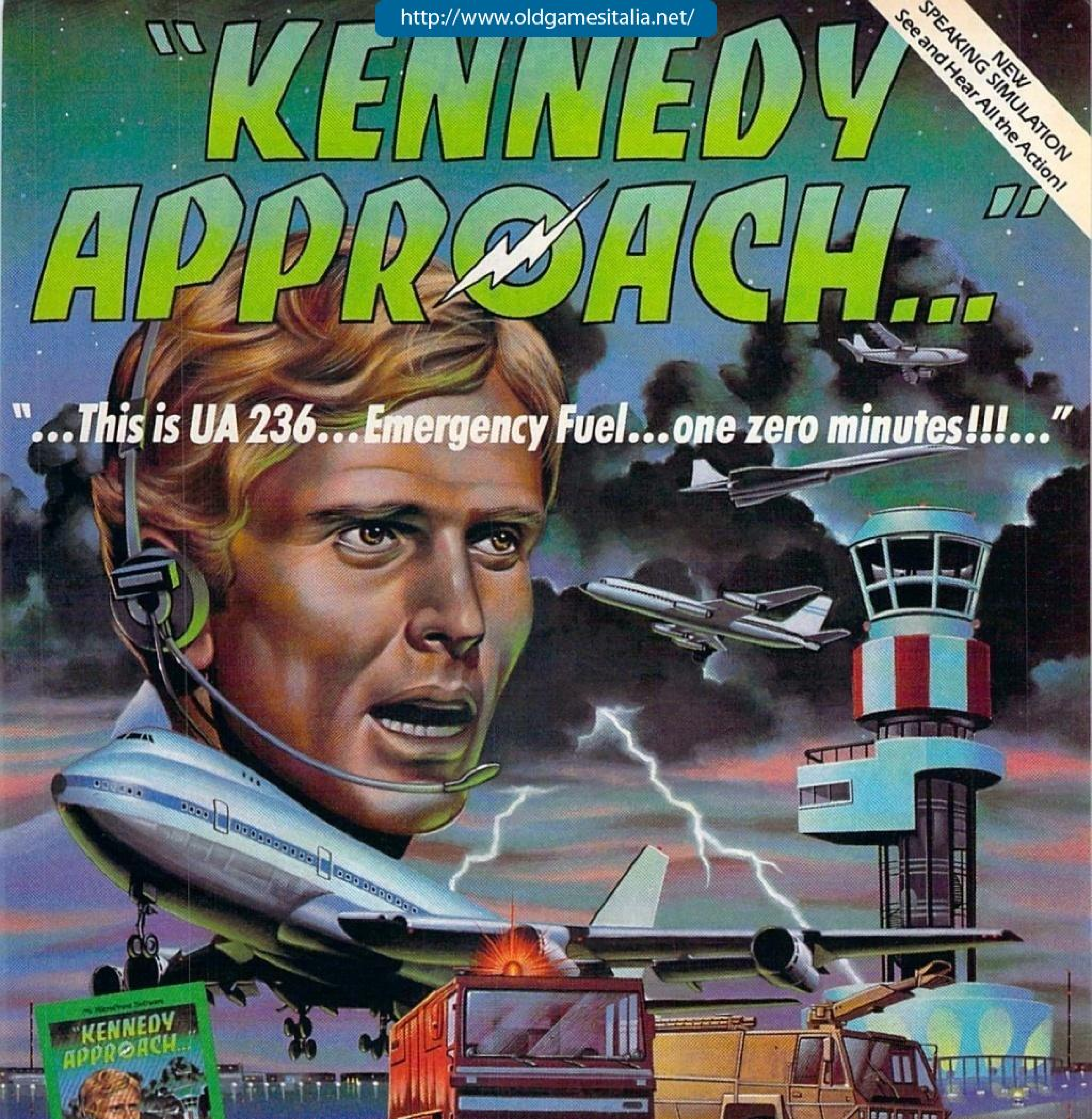
Goal tending, stickhandling, shooting the puck and player movement are all controlled with the joystick and /or joystick-firebutton combination. This uncomplicated manipulation scheme helps make *Slap Shot* easy to learn, though the action itself is hard to master.

The longer the firebutton is depressed, the further and higher the puck travels. This correlation between duration and distance is another fine example of the thought and planning behind this excellent sports simulation. Even goalie control (high, low and in-between blocking) and animation are incredibly true to life.

Besides the first class accommodations described so far, *Slap Shot* offers another intriguing high-tech masterpiece—voice synthesis. Electronic Speech Systems gets a trunkful of kudos for the unbelievably crisp, clear, close-to-human speech quality. It is without a doubt one of the finest examples of synthesis I've heard from a 64.

Though limited in scope, the vocabulary livens the action and builds excitement, tension and player involvement. Whether it's the referee crying "Penalty!" or the crowd chanting "Charge!" (accompanied by the proper organ music no less), the vocal renditions really make the game. But I've saved the best for last. Once the puck has been slapped into the net, some anonymous person (announcer, spectator, coach?) lets loose with, "He scores!" Of course, this will be everyone's favorite saying, once they've got the offensive routines down pat.

Artworx has produced a real gem. It's the best computer hockey game on the market today. Paraphrasing the game itself, "It scores!" ■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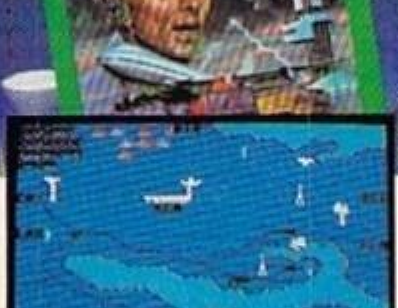
Commodore-64 Screen Picture

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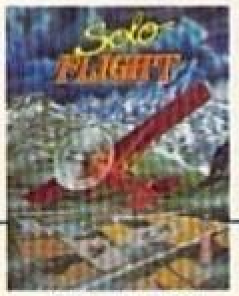
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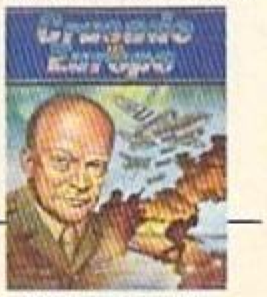
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REVIEWED BY FRANCIS AMATO

F-15 Strike Eagle

Computer: Commodore 64
Publisher: MicroProse
120 Lakefront Drive
Hunt Valley, MD 21030
Medium: Disk

F-15 Strike Eagle is a simulation of modern air combat that lets you jump into the cockpit of a $20 million aircraft to defend freedom from a variety of powerful enemies. After the program loads, you are presented with the mission options. The number keys choose which scenario you would like to fly: F1 chooses one of four skill levels, F3 allows up to four players and F7 starts the game.

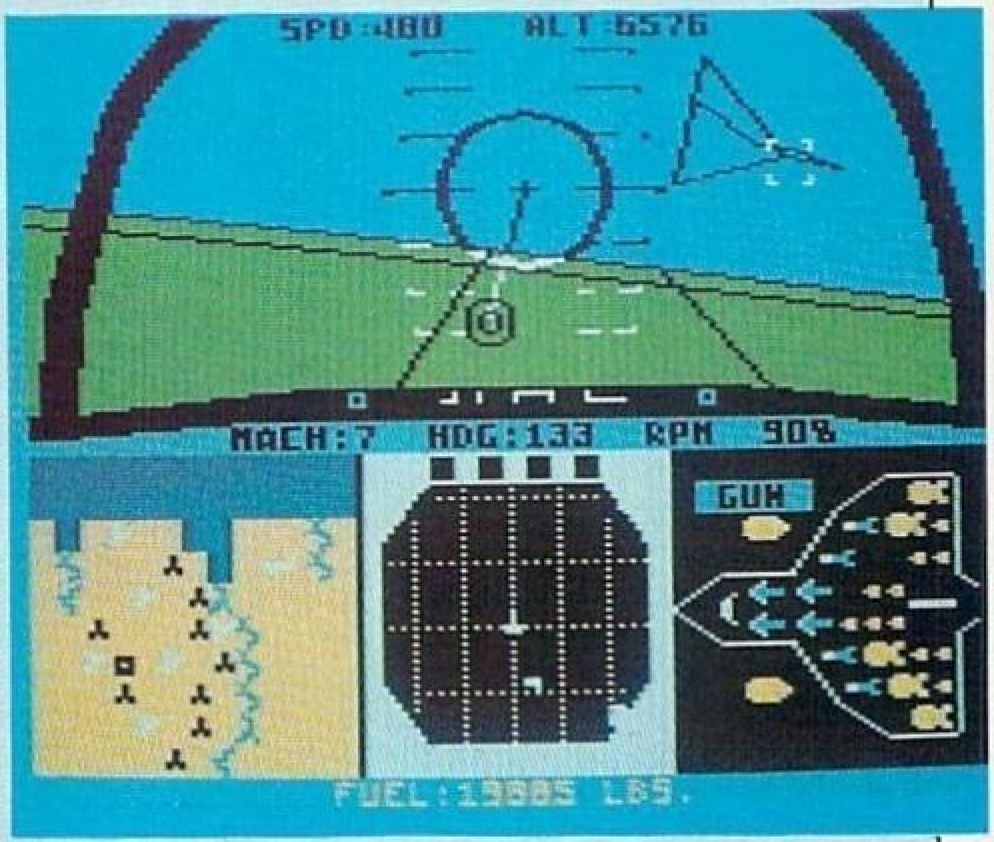
Your overall mission is simple. Using the joystick to fly the plane and the keyboard to choose offensive and defensive options, rack up points by destroying planes and ground targets. Your high score will be carried over from mission to mission, but won't be saved when the computer is turned off.

The first skill level is called Arcade. Flying the plane is easy and survival is simple. The enemy is a lousy shot and you're a Buffalo Bill. The only real danger in the Arcade level is running out of fuel.

The remaining levels (Rookie, Pilot, Ace) are much more realistic. It takes a lot of getting used to, but actually flying the Eagle is what this simulation is all about. The Eagle is more maneuverable at higher levels. But of course at higher levels, your plane's capabilities are decreased while the enemy's capabilities are increased, just as in real life air combat.

The seven scenarios are Libya, Egypt, Haiphong, Syria, Hanoi, Iraq and the Persian Gulf. Each scenario offers more challenges and better enemy reactions. Though it's not specifically mentioned, in three instances you're actually an Israeli pilot and not an American one.

Jump into the cockpit of a $20 million aircraft to defend freedom from powerful enemies.



The playing screen is divided horizontally in half. The top cockpit view is the HUD (Heads Up Display). The HUD gives information on the status of the plane and on any threats coming your way. It displays gun- and bomb-aiming points, pitch lines, a flashing steering cue and messages. The HUD also displays target indicators which show when an enemy plane or missile is going to appear and where it will appear. You also see a grid-like, scrolling view of the ground. *F-15 Strike Eagle* has what passes for 3-D graphics in that an object grows larger as it comes closer.

The bottom half of the screen is divided into three sections. One is an overview of the mission area showing your plane, your base and all enemy targets. You maneuver a rectangle onto the target you wish to bomb using the cursor keys. Once done, you line up a steering cue on the HUD with a center-aiming point and you'll be headed right for the target.

The second section is a radar scanner. It shows a long-, medium-, or short-range radar view of the mission area. This locates targets in the vicinity, enemy planes in the area and missiles coming your way. There are also four warning scanners which show how an enemy missile is being guided, whether your altitude is too low and if you're running out of fuel. Especially make sure to constantly check the fuel level.

The last third of the screen is a silhouette of your plane. It tells what weapon you have selected and the number of missiles, bombs and flares remaining.

To give you an idea of the Eagle's capabilities and the dangers you face, the enemy can fire infra-red or radar-guided SAM (surface-to-air) missiles. You try to survive by fancy flying, ECM (electronic counter-measures) or launching flares.

Three different types of enemy planes will attack. Two are less capable than the Eagle, but one, the Mig-23, is almost your equal. While the enemy is firing guns or launching air-to-air missiles at you, you must avoid or shoot the planes down with your gun or one of eight short- or medium-range missiles.

The only really annoying problem is that you can't see the ground targets very clearly as you pass over them. They're in outline form so they're especially easy to miss. But just think of it as adding to the fun. You should be able to get the hang of it in a dozen or so plays. Handling the plane, however, is a different story. Just wait until you accidentally do a loop and try to figure out why the plane is flying upside down.

I like *F-15 Strike Eagle*. It is a good value and an excellent game. But at $20 million a plane, I've already cost the government two billion dollars. Glad I didn't make the Air Force my career. C

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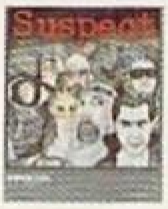

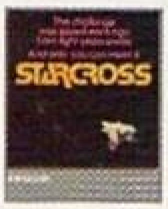

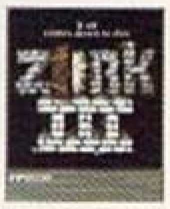

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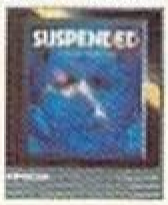

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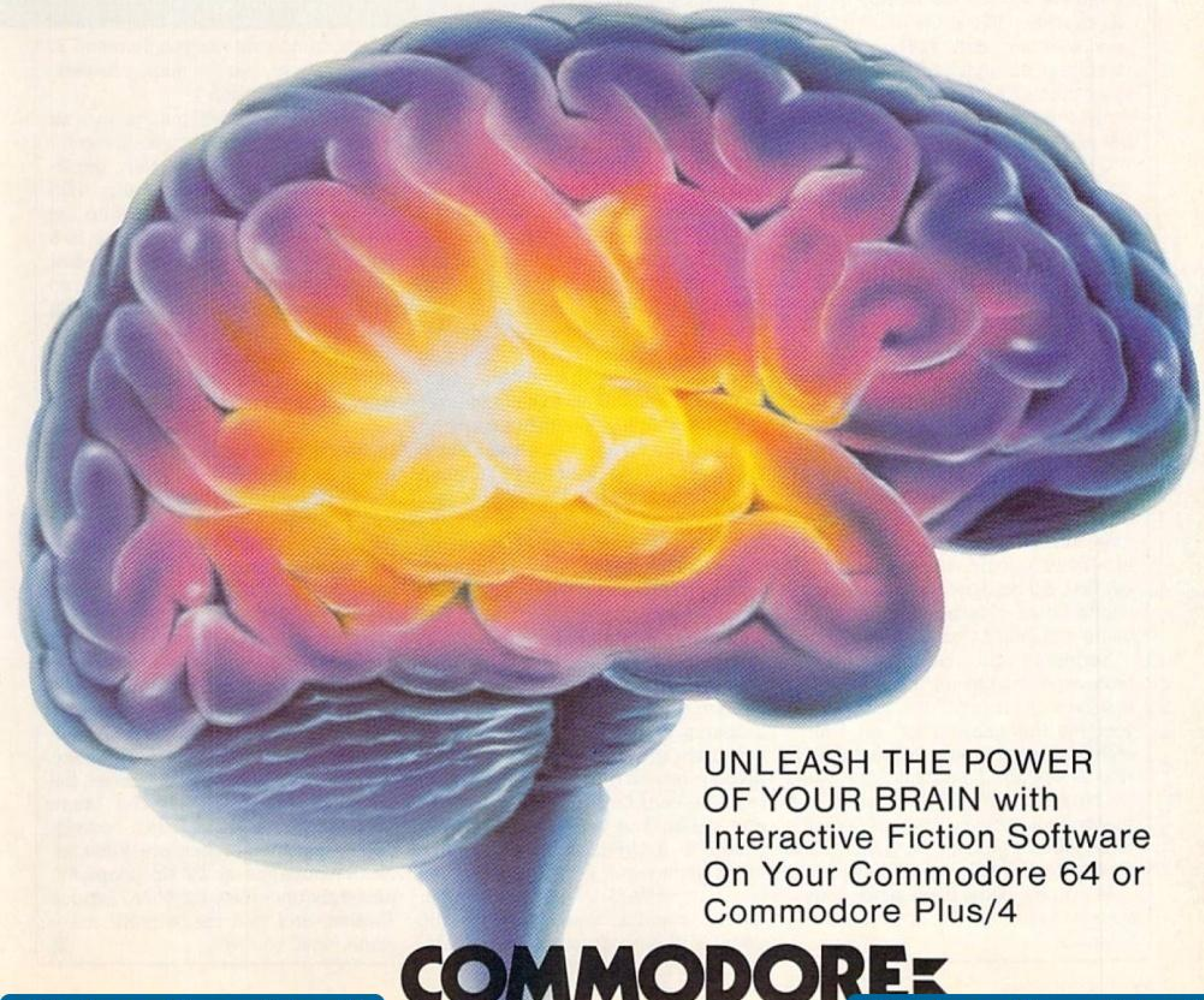

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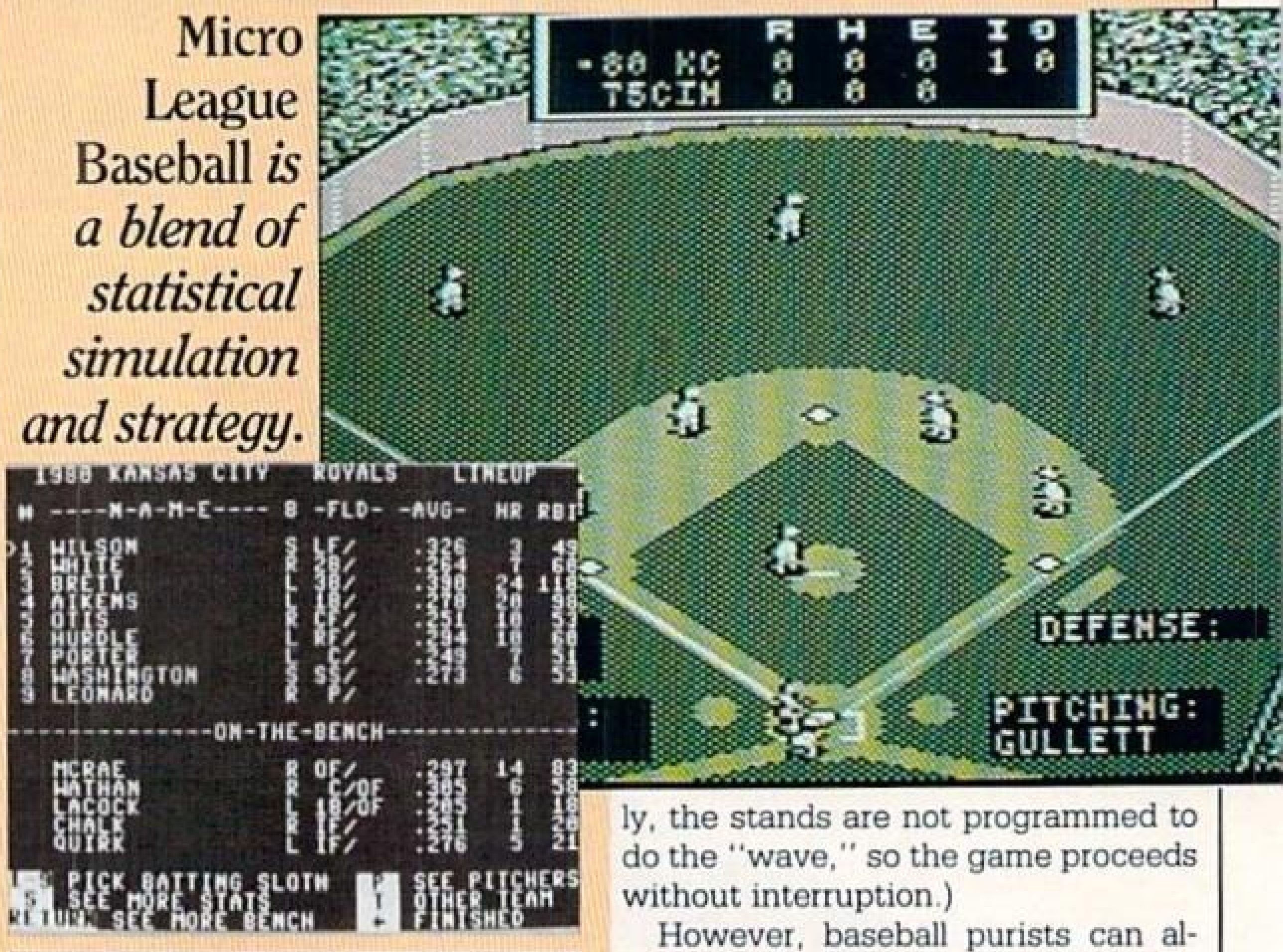
COMMODORE

REVIEWED BY RETT WISMAN

Micro League Baseball

Computer: Commodore 64
Publisher: Micro League Sports
Assoc.
28 E. Cleveland Avenue
Newark, DE 19711
Medium: Disk

Micro League Baseball *is a blend of statistical simulation and strategy.*



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 1980 KANSAS CITY  ROYALS   LINEUP
# -----N-A-M-E---- B -FLD- -AVG-  HR RBI
>1 WILSON          S LF/    .326    3  49
 2 WHITE           R 2B/    .264    7  6
 3 BRETT           L 3B/    .390   24 118
 4 AIKENS          L 1B/    .278   20  98
 5 OTIS            R CF/    .251   10  53
 6 HURDLE          L RF/    .294   10  60
 7 PORTER          L  C/    .249    7  51
 8 WASHINGTON      R SS/    .273    6  53
 9 LEONARD         R  P/
---------------ON-THE-BENCH---------------
   MCRAE           R OF/    .297   14  83
   WATHAN          R  C/OF  .305    6  38
   LACOCK          L 1B/OF  .205    1  18
   CHALK           R IF/    .251    1  20
   QUIRK           L IF/    .276    5  21
  PICK BATTING SLOTN        SEE PITCHERS
  SEE MORE STATS            OTHER TEAM
RETURN SEE MORE BENCH       FINISHED
```

Here's something eclectic baseball fans will enjoy: *Micro League Baseball*, an artful blend of statistical simulation and personal strategy. Micro League Sports Association, a small, hard-hitting group out of Newark, Delaware, has marketed *Micro League Baseball* with the hope that it will quickly catch on with all the ball fans who are now rolling dice and thumbing through table games. The only computer strategy game endorsed by the major leagues, the game blends your managerial moves with the actual statistics of real teams and players.

After a simple LOAD, the game whisks you to a list of great teams from the past (more are available, including the current season in progress, from separately purchased "team disks." And if the team you desire is not presently on disk, Micro League Sports will create it for you). After you pick the teams, you can decide whether you want to manage one team or have the computer do it. Thus, it's human vs. human or human vs. computer in a match of historic confrontation, minus the tobacco-chewing. You select your own lineups in a flexible, efficient manner (pitchers first, so be careful). The historical lineup for each team is also available using a default command.

Suddenly, the white-clad home team waddles out on the field and a few bars of the national anthem tell you that this game is for real. Unlike arcade, the game that follows is a statistical flexing of data influenced only by baseball probability, chance and managerial option. The only joystick to be found in this game will be Babe Ruth's flailing bat, as his power and .356 average come to life while you sit somewhere in the upper deck behind the plate.

Barry Morstain, president of Micro League Sports, says that the complicated merger of statistics, including left- and right-handed effects, is calculated using his company's proprietary algorithms. A sample of several games seems to prove him right: batting averages, slugging, stealing, strikeouts, walks and more fall into place as pitcher and batter clash. However, it's still up to the manager to pinch-hit, play in at the corners, hit and run, go for the extra base or tell the pitcher he's losing it! You can make lineup changes (usually a sore spot in games of this type) using an ingenious wrap-around scroll of the bench and a replacement command. Both batting and fielding changes are quickly accomplished.

Outstanding graphics is a big feature of the game. The baseball and its shadow produce a special depth perception that allows you to see flyballs dropping in for hits or spy grounders scampering by infielders. The scoreboard provides a play-by-play, so you can't be confused by the outcome of any at-bat. The fielders and runners scurry in a logical fashion for each event, so a result is neither betrayed nor contradicted by player positioning. A colorful crowd watches the game in the background. (Fortunately, the stands are not programmed to do the "wave," so the game proceeds without interruption.)

However, baseball purists can always find minor flaws in such a complex automation. In certain game-winning situations, more runs than the tie-breaker may score before the contest is "over," which results in a faulty final score. Defensive statistics are generalized in a rating system, so those who are squinting for fielding averages or chances per game, conventional measures of glove prowess, will find neither. In fact, secondary player characteristics, such as running, fielding, home runs allowed and throwing arm—things a real manager needs to know—are assumed general knowledge and not displayed. Such minutia hardly detract, though, for there are more than enough batting and pitching stats for most to worry about. Most, in fact, are just worried about who's ahead.

All in all, this game is a giant step towards total sports simulation, a growing avocation. The game is well supported with literature and follow-on data of current-season and special-edition team disks, so a tournament or mini-season is no problem for the baseball fanatic. But is the Micro League Sports Association complacently splashing around the World Series champagne now? No. Plans are presently underway for *Micro League Football* and that might *really* make some video widows. C

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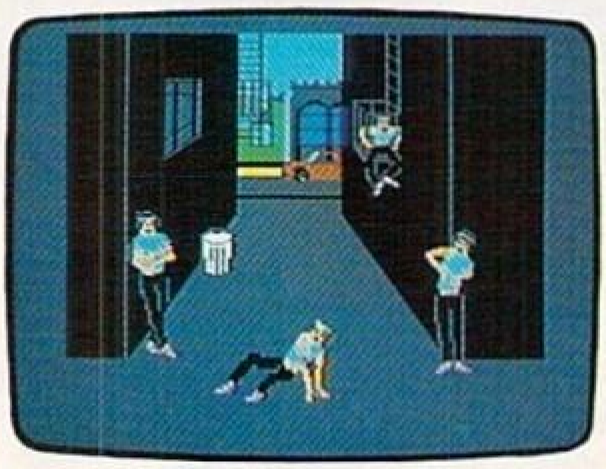
REVIEWED BY PETER DEAL

Break Street

Computer: Commodore 64
Publisher: Creative Software
960 Hamlin Court
Sunnyvale, CA 94089
Medium: Disk

As you have probably guessed, *Break Street* is a breakdancing game. No, the game doesn't breakdance, but Whiprock, Showrock, Double Trouble and D-Dog do, controlled by a joystick. But watch out, your breaker might get too tired if he breaks too long.

But, of course, then there is the warmup. Your breaker can do any of his moves and he won't get tired. But if you skip a warmup, you may find that your breaker won't break too well in competition. He will probably fall when you tell him to do a freeze (how a breaker ends his turn by getting into an unusual position and being motionless for a few seconds).



The graphics are so detailed that even the breakers who aren't breaking tap their toes to the music.

You are scored by how well you switch from move to move, and you can earn bonus time by switching from a hard move to another hard move, such as a scorpion (spinning on two hands with your elbows stuck in your stomach) to a headspin (spinning on your head). And if you score enough points, you will get to put your street name (a name everybody calls you when you break, such as Turbo, Kid Loose, King Tut, Flex, Crazy Legs, Mr. Fresh) on the Wall of Fame.

The graphics of *Break Street* are great. It's worth buying the whole game for the graphics alone. When your breaker is doing a move, it looks almost like a real person is breaking. The graphics are so detailed that even the breakers who aren't breaking tap their toes to the music.

The music is well done, but it needs a little more variety. The instructions are complete and easy to read, so overall, the program is easy to use.

I really enjoy *Break Street*, especially because I am a breakdancer myself. I recommend *Break Street* to anyone who likes breaking or even someone who just wants to learn.

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REVIEWED BY ARNIE KATZ

Spy vs. Spy

Computer: Commodore 64
Publisher: First Star Software
18 E. 41st Street
New York, NY 10017
Medium: Disk

The cutthroat competition between artist Antonio Prohias' beaknosed secret agents has enlivened the pages of *MAD Magazine* for 25 years. First Star's *Spy vs. Spy*, an action-strategy contest for one or two players, brings the essence of these humorous yet frenzied confrontations to the home computer screen.

The gamer controls one of two spies who are searching for secret plans in an embassy. A spy must find the briefcase, fill it with a passport, traveling money, the key and the plans, and exit the door which leads to a waiting escape plane. Agents not only work against the on-screen countdown clock but each other's machinations.

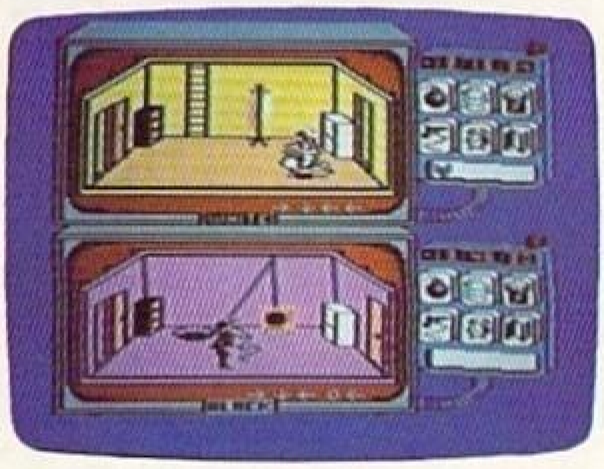
A horizontally split display is the heart of *Spy vs. Spy*. The top half shows the actions of the White Spy while the lower portion monitors the activities of his raven-cloaked rival. The player must keep an eye on the rival spy while directing the one under his or her control.

Each mini-screen shows the room in which the spy is located in pseudo 3-D perspective. The gamer moves an agent around the complex with the joystick and hunts for the valuable items hidden in assorted secret places. The player can search any object in any room by pushing the action button when the agent stands near it.

The agent can carry only one item at a time, unless the things are small enough to fit inside the briefcase. When strategy dictates temporarily hiding a found item, the player hits the action button when the spy is next to the desired spot.

At higher skill levels, the embassy may be several stories tall instead of only one. The spy climbs ladders to reach the top floor and jumps through trapdoors to get to the bottom level.

The small character indicators found just below the front edge of each room, "bread crumbs," provide a handy way for players to keep track of their spy's route through the embassy. The agent can retrace steps through up to nine rooms by following the "bread crumbs."



Re-create the MAD magazine conflict.

The only time both spies appear on the same half-screen is when they search the same room. This situation also affords the only opportunity for direct, hand-to-hand combat. The on-screen agent swings a club at his adversary when the gamer pushes the stick while the action button is held. When the gamer moves the stick forward and back, the agent swipes at the other spy's head, while side-to-side stick movement causes a poke in the ribs.

The time limit for the mission varies from seven minutes at the easiest difficulty setting to 24 minutes at the hardest. When caught by a trap or bested in direct fighting, the losing spy goes unconscious for 27 game-seconds. The agent also loses a few seconds, signalled by a series of beeps, when he trips a trap.

A warning light on top of the Trapulator blinks when a spy is about to run out of time. When a spy's time is up, the other agent can use whatever surplus time he has accumulated to complete the mission unmolested.

The Trapulators, located to the right of the corresponding displays, are the focus of the interplay between the two agents. They show the time remaining on the clock, items collected and a group of six icons. Five icons symbolize traps which a spy can set to prevent his foe from making too much progress, while the sixth flashes a map of the embassy complex on the screen as an orientation aid.

When the gamer pushes the action button twice in rapid succession, it activates the Trapulator. The arsenal contains 12 to 72 traps, depending on the difficulty level, divided into five types: the bomb, the giant spring, the water bucket, the gun-and-string combination and the time bomb. The first two can be used anywhere except on a door, the next pair can be employed only in conjunction with a door, and the last is a time-delay device which explodes 15 seconds after it is set. Within these limitations, an agent can hide the traps anywhere to inhibit the opponent's searches. When a trap claims a victim, the perpetrator laughs uproariously in a scene right out of the comic strip.

A defense exists for every trap except the time bomb. For example, the water bucket douses the bomb and the umbrella shelters a spy from a water pail above a doorway. Each remedy is always hidden in the same place. That is, the aforementioned buckets are in the red fire boxes which are invariably located on the left wall of the rooms which contain them.

The audio-visual effects are outstanding. The characters look like they just jumped off the printed page and the animation dovetails with the overall lighthearted tone. And when a player guides a spy through a successful mission, the airfield sequence is a fitting cap to a thoroughly enjoyable action-strategy contest.

Although *Spy vs. Spy* is primarily designed for head-to-head play, designer Mike Riedel has clearly put a lot of effort into making the solitaire version as playable as possible. Prior to the start of the game, the gamer decides the I.Q. level at which the machine opponent will operate. Smarter robot adversaries utilize a cunning blend of offense and defense which is calculated to give even the experienced human gamer a stiff challenge.

Spy vs. Spy is one of the most innovative—and one of the most entertaining—programs published recently for the Commodore 64. C

REVIEWED BY MARTIN SMITH

Championship Lode Runner

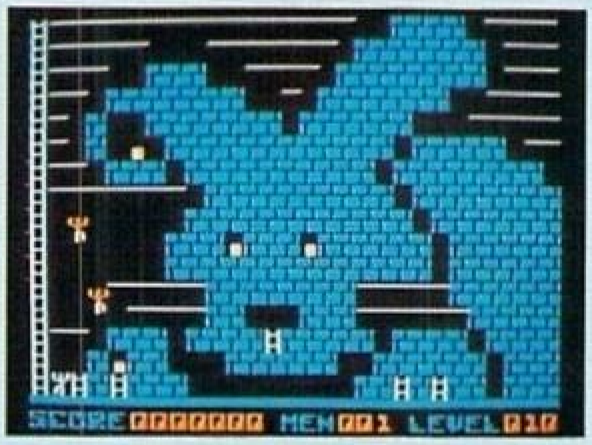
Computer: Commodore 64
Publisher: Broderbund
17 Paul Drive
San Rafael, CA 94903
Medium: Disk

Championship Lode Runner may be described as an extension to the original *Lode Runner* by 50 superb new screens. Like the original game, it has excellent high-resolution graphics and appropriate high-quality sound effects. Unlike the original, it does not have a practice mode. You can gain access to successive levels only after you have successfully completed the previous levels. When you do complete Level 1, however, and the screen for Level 2 first appears, you can save it on the game disk—provided you do so before playing it.

Suppose, for example, after beginning play at Level 1 with the usual allotment of five men, you succeed in completing the level on your first attempt. The screen for Level 2 will appear and will show that you now have six men. It will definitely pay you to save Level 2 before playing it. When you subsequently recall it, you can always begin playing Level 2 with six men. However, suppose you now lose all six men in attempting to complete the level. You can again recall Level 2, but this time you will start with one less man (five in this case). Thus, by saving Level 2 before beginning play, you will have provided a potential maximum of 6 + 5 + 4 + 3 + 2 + 1 = 21 men.

It will similarly pay you to save at the beginning of each new level. When you reach a total of ten saves, you will have to delete a save before you can save the next time. After you have saved a level, you can, if you wish, turn the computer off. When you later reload the program, you can resume play at the same new level, something you could not do with the original *Lode Runner*.

Another improvement incorporated in *Championship Lode Runner* is the elimination of both the "slow fade" and "slow reform" following the loss of a man. In addition, the waiting time between the end of a completed level and the beginning of the next one has been markedly reduced. The visuals have been dressed up somewhat by the inclusion of the screen title which appears when the last gold chest for each level is collected.



If you are a confirmed Lode Runner *enthusiast and have "paid your dues" on the original,* Championship Lode Runner *is for you.*

Doug Smith (author of both games) and Broderbund warn that "*Championship Lode Runner* is for *Lode Runner* experts only…and if you haven't yet paid your dues on the original *Lode Runner*, don't even think of attempting this championship round." In addition, rumors were circulating to the effect that, even for experts, some of the levels might require several weeks to complete.

Long before *Championship Lode Runner* appeared on the scene, I had already mastered the 150 screens of *Lode Runner* sufficiently to make continuous (or high score) runs from Level 1 through Level 150 (in my best run I had 144 men at the end, out of a possible 155). I had also completed a few continuous runs through Level 300. In Levels 151 through 300, the same screens are repeated but the guard speed is increased significantly. This causes a dramatic increase in the degree of difficulty, particularly for certain levels such as 252 and 286.

In addition, except for a few levels that are definitely uncompletable, I had completed each level for the Third Series (Levels 301-450), the Fourth Series (451-600) and a portion of the Fifth Series (601-650). With each new series, many of the screens become progressively more difficult due to the additional increase in guard speed. The levels that were uncompletable were bypassed using a "cheat key."

Among other skills developed, I had become proficient at digging behind the runner, as well as at digging ahead. Digging behind the runner is particularly advantageous for multilayer drilling. It is practically a necessity for completing Level 146 and for drilling through six or more layers as required in some of the screens I designed myself.

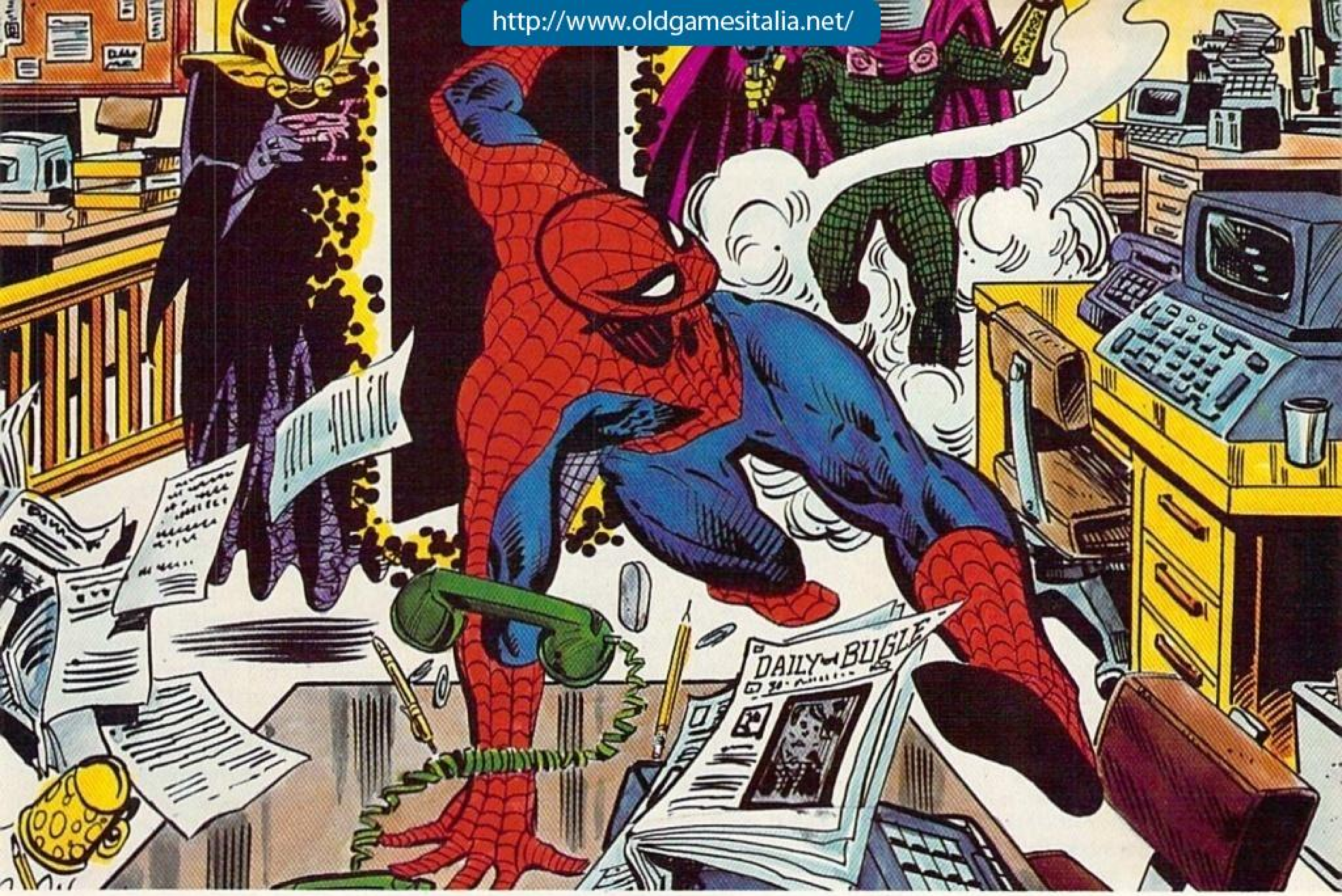
With all this *Lode Runner* experience under my belt, I felt I had more than paid my dues—and I eagerly awaited a chance to try my stuff on the championship round.

When I finally laid hands on a copy of the game, I found that *Championship Lode Runner*, while drawing heavily on skills already established, poses at the same time a whole new set of challenges. The 50 new screens are totally different in appearance from the 150 old screens and they certainly play differently. This is not surprising since these screens were designed by ten expert players, all of whom were doubtless intimately familiar with all the old screens.

The challenges to be met in the various screens are of two general types: procedural and performance. By procedural, I mean the challenge is to arrive at the most effective detailed plan or procedure for completing the level, either by trial and error or by analysis, or both. It involves such considerations as what order of events to follow, how to control the guards, whether to dispatch them, whether to avoid killing them, whether they can be confined, and if so, where and how.

By performance, I mean the challenge is to follow exactly the detailed plan adopted. When tackling a new screen a player must meet the proce-

Continued on pg. 28



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dural challenge (if any) before taking on the performance challenge and completing the level. Meeting this procedural challenge will usually consist, in part at least, of identifying one or more apparent impasses and then figuring out how to get around them. The first such impasse in *Championship Lode Runner* occurs in Level 1, where the player must recover two low-placed gold chests without becoming trapped below.

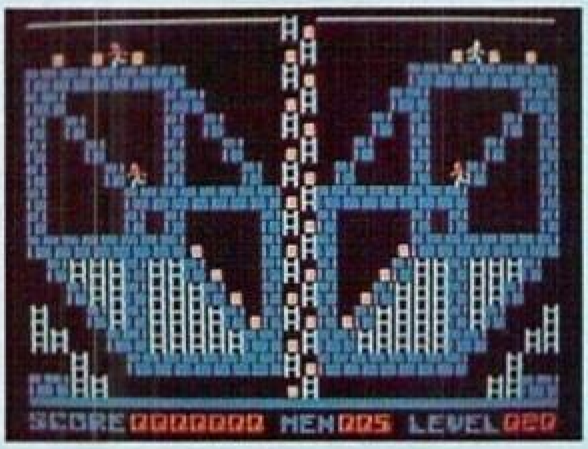
When I visited a local software store to pick up a copy of the game, I found that several of the salesmen, all of whom were skilled *Lode Runner* players through at least Level 20, had been trying Level 1 of *Championship Lode Runner*. They had been able to collect all the upper gold chests but could not deal with the impasse posed by the two lower chests. Not only were they unable to complete Level 1, but they knew of no one who had.

But this was before the *Championship Lode Runner Hint Book* (Broderbund, 1984) became available. (I received my copy while working on Level 22 several days later.) Except for Level 50, the hints given in the *Hint Book* make it possible for even intermediate players to get around all the impasses. In effect, access to a *Hint Book* eliminates the procedural challenge, or at least greatly simplifies it.

Does having access to a *Hint Book* turn *Championship Lode Runner* into a piece of cake? Not quite! There is still the performance challenge—and there is still Level 50 (but more on that later). For the first 11 screens, and for perhaps another 11 screens below Level 33, the degree of performance difficulty might be described as moderate, although tricky in spots. Intermediate (or more advanced) *Lode Runner* players should be able to perform these screens after a reasonable amount of practice.

The remaining 28 screens, however, range in difficulty from tough to incredibly tough—as suggested by the following examples. (Since the *Hint Book* contains diagrams of all the screens as well as procedural hints, I feel that I am not giving anything away.)

In Level 21, you must drill through two layers of bricks, drop onto a suspended gold chest and the runway below, move left to a certain brick, drill into a vault, move right as you collect five gold chests and promptly drill out of the vault. If you have not lost any time in these movements, you will emerge from the vault just in time to step on the head of a moving guard and thus gain access to a ladder which can be reached only in this manner. Level 27 requires an even more difficult maneuver. You must cross from one ladder to another by stepping to the right onto a guard's head while the guard is moving to the left.



Rumors were circulating that, even for experts, some of the levels of this game might require several weeks to complete.

In Level 24, you must dig away 22 bricks to reach the gold chest in the bunny's right eye (on the left side of the screen) and another 34 bricks to reach his left eye, including two lines of six bricks each. Yet the hardest part of this screen may consist of killing off the two guards (by digging away portions of the right ear) until they reappear in a remote area.

Split-second timing is required more frequently at the higher levels. In Level 34 (appropriately entitled "Split Second"), for example, you must make no less than 19 timed mini-trips, of which about half are very tightly scheduled. If you survive all these mini-trips, you may be confronted with a very tricky escape attempt and could see all your efforts go down the drain. You'll likely have plenty of failures and create some new cuss words before you get through this level.

Level 41 is fairly routine until you collect the last gold chest, which must be a certain one. This causes the release of three trapped and widely separated guards who promptly begin moving down the screen. You must immediately begin a long escape run in which you will step on the head of each guard, in turn, in order to bridge the three gaps in the escape path.

In Level 46, you must drop the two top guards into a "trap-door trap," dig your way to the bottom right, trap a low guard in a hole near the floor, then pick up the remaining visible gold chests on the screen, ending up on a solid (undiggable) runway three units from the floor. To your right is a gap in the runway which you must cross. Half a unit down the gap is the bobbing head of the gap guard who is standing on a ladder. You must run toward the gap, hoping that when you drop onto the guard's head, you will bounce up high enough to enable you to get across. You may or may not make it. If you do make it across the gap, and if the guardhole has been filled with a ladder, you can escape routinely. If the guard is still in the hole, you still have plenty of work to do.

First, you must dispatch the gap guard. Drill down and get on the short ladder just to the gap guard's right, dig the block to the left, stay atop your ladder until the brick is about to fill in, then drop sharply in the ladder to draw the gap guard toward you. (How do you know when the brick is about to fill in? By referring to your stopwatch, of course. Just subtract about one second from the premeasured closing time.)

With the gap guard done, you must execute a series of moves in which the hole guard is freed and then led into the gap. If he carries the last gold chest into the gap, you must dispatch him just as you did his predecessor. If your stopwatch comes through for you again, you can pick up a well earned gold chest and escape to the wonders of Level 47.

When you get to Level 50, you will realize that the toughest level has been saved for the last. Since the *Hint Book* provides just one minor clue, you must rely on your own efforts in order to meet the severe procedural challenge. If you are sufficiently persistent and resourceful, you will eventually find that the level can be completed by breaking it down into some 24 segments which must be performed in exact order.

In one of these segments, while standing on a guard's head, you must free the guard, stay on his head as he moves left and begins his fall (no mean trick—the guard's not very cooperative), then dig two bricks on the way down. Eight of the segments are timed mini-trips, of which five are very tightly scheduled. Each of these five is a problem unto itself and needs to be practiced separately until perfected. (I found it expedient, if not essential, to switch temporarily to "digging ahead" for each of two of these segments).

Once you have mastered the separate mini-puzzles, you should be able to string them together, complete the level and break out the champagne.

Before I started on *Championship Lode Runner*, I had been quite skeptical about the reported statement that "even for experts, some of the levels might require several weeks to complete." I decided that when I got my copy of the game, I would pull out all the stops to prove that the statement did not apply to me. I was particularly gratified, therefore, when I succeeded in completing all 50 levels in 17 days. This still seems like rather a long time to me since I was able to devote full time to the game and I had the help of the *Hint Book* for the levels above 21.

If you are a confirmed *Lode Runner* enthusiast and have "paid your dues" on the original game, *Championship Lode Runner* is for you. With its 50 superb new screens, you'll get more than your money's worth of challenges—especially if you choose not to use a *Hint Book*.

If you are an "intermediate" player and haven't yet worked your way through the original *Lode Runner*, you would be well-advised to go back and do so before attempting the championship round. And be sure to get plenty of practice at digging behind the runner, particularly in multi-layer digging. C

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REVIEWED BY DX FENTEN

Indiana Jones in the Lost Kingdom

Computer: Commodore 64
Publisher: Mindscape
3444 Dundee Road
Northbrook, IL 60062
Medium: Disk

The suspense builds as you put Mindscape's *Indiana Jones in the Lost Kingdom* into the drive and boot the program. After all, the packaging uses a fabulous likeness of the title character and a marvelous tease: "The ultimate challenge. Nobody told Indiana Jones the rules. And no one will tell you."

Your patience is soon rewarded as you listen to the computer's reasonably accurate rendition of the theme from the Indiana Jones film. You know there are no rules, but you know what you have to do. According to the booklet that comes with the program, "Your objective is to retrieve the artifact while scoring as many points as possible. To do this you must find your way through six rooms—something only a person with an extremely high IJQ (you ignore this, because you've been told it stands for "Indiana Jones Quotient" and he can do no wrong) will be able to do.

Each room is completed by solving its "puzzle." Each solution is different and, unfortunately, the answers have been lost to the ages. If you unlock the secret, a clue to the location of the screen's exit will appear. Upon completing all six screens, you find a treasure unequalled in the annals of archeology...and you're ready to move to the challenge of the next level and/or to try to improve your score.

INDIANA JONES
IN THE
LOST
KINGDOM ™
BY MICHAEL J. HANSON
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Since there are no rules, you must rely, almost entirely, on your own intuition, logic and skill.

The graphics and the character movement within the program are quite good, as is the color and the sound. The program moves along nicely enough, according to your own skill level (you pick a skill level before you get started on each room), considering that there really are no rules to follow and you are constantly trying to "think like Dr. Jones." Progress is slow in completing the challenge of a single room, but with infinite patience and the desire to play the game several times, it can be achieved. However, along with your skill level's rise, there also seems to be a concurrent rise in the frustration level. It is in this area that the game seems most flawed for most players.

Should you be the kind of person who can sit, hour after hour, enjoying the challenge of trying to figure out what the creators had in mind and "think like Dr. Jones," there is a very good chance you will love this game. Otherwise, you'll soon need either a break from the game, some aspirin, or some additional help in the way of clues. True to the sport and spirit of the original Indiana Jones, the game offers you some clues at the bottom of each page of the instruction booklet. Of course, as with Indiana, nothing comes easily and you must work (if only a tiny bit) to find these clues.

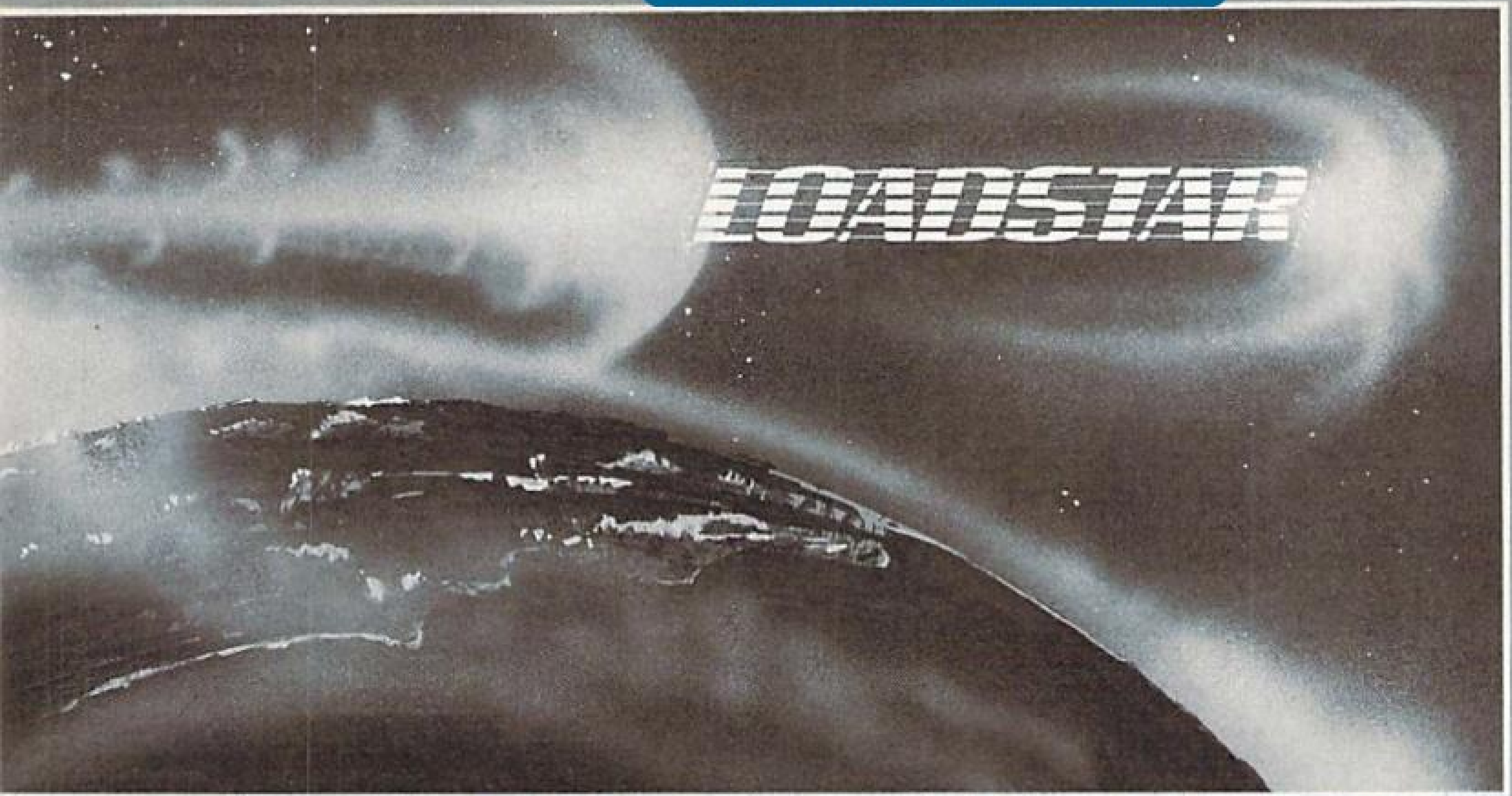
Enclosed with this package is a magic viewer said to have the power to decipher the mysteries of the ages. Actually, the magic viewer is a piece of cardboard-framed red plastic (reminiscent of the glasses they once gave out to view 3-D movies) which you hold over "the hieroglyphics which may point to the treasures of the Lost Kingdom." The clues you find at the bottom of the pages are helpful, but they, more often than not, do relatively little to really help you move along.

When the frustration level has reached its peak and you're "completely stuck, have nowhere to turn, are beginning to panic, and your friends are starting to worry about your health, never fear. More clues are available for the six rooms." At this point, there is a unique feature that will either be loved or hated by game owners and/or their parents. Called a "clue hotline," this feature allows you to directly access a microcomputer by telephone for clues to help solve the mysteries presented.

Remember, in this *Indiana Jones* program you must rely almost entirely on your own intuition, logic and skill to escape each room. At the point of complete bafflement, you simply dial a number (24 hours a day, 365 days a year for callers with a Touch-Tone phone) and the computer on the other end will automatically respond to your cry for help (according to the selected-clue code that you punch into the Touch-Tone buttons) with selected clues. Though the clue doesn't really eliminate your dependence on your own intuition, logic and skill, it certainly can go a long way toward helping you retain your sanity and move ahead in your search for the fabulous artifact.

Why would anyone dislike this sort of high-tech game feature? First and foremost, the clue hotline, located in Illinois, is not a toll-free call. Imagine the consternation on the faces of parents faced with line charges, at any time of the day or night, 24 hours a day, 365 days a year, for any and all of the six rooms. Should the game player not have a Touch-Tone phone, he or she would require the assistance of an operator (only available on weekdays between 9 a.m. and 4 p.m. Central time) to get into the system and again to cue up the selected clue code.

There is a great deal to be admired and enjoyed in this program. There is also a great deal that is just a little bit forbidding to the "regular" game player. The key seems to be your desire to win the game, to stick with it, to endure the changing requirements throughout the game and to accept the challenge created by the omission of any written rules. C



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REVIEWED BY DAN GUTMAN

The Hitchhiker's Guide to the Galaxy

Computer: Commodore 64
Publisher: Infocom
55 Wheeler Street
Cambridge, MA 02138
Medium: Disk

The computer world has been waiting for a *Hitchhiker's Guide to the Galaxy*. Author Douglas Adams has finally abandoned that antiquated paper and ink passive reading system, and plunged whole-heartedly into transforming his book into interactive fiction. *Hitchhiker* is very well done indeed and should convince other famous authors that there just might be something to this new medium after all.

This is the first Infocom game to be based directly on a book, so it provides a good opportunity to compare the experience of both media. In the book, you read the fictional story of Arthur Dent and his happy-go-lucky days wandering around the galaxy after the destruction of the Earth. In the game, you *are* Arthur Dent. You can't just sit back and enjoy Dent's adventures—the bulldozing of his house, escaping the planet, sticking a fish in his ear, etc. You've got to make it all happen.

Like all the Infocom games, *Hitchhiker* is based on a series of puzzles. If you don't solve a puzzle every few minutes or so, poor Arthur gets bulldozed to death, thrown out of a spaceship or meets his maker in some other amusing way.

Naturally, the story is more engrossing when you're directing the actions of the hero, rather than just observing them. At the same time, the game demands more from the player/reader than the book does. Playing the game is a very different experience from reading the book. Both are very enjoyable.

Adams has stuck pretty close to the plot of his zillion-selling book. All the characters are here: Ford Prefect, Zaphod Beeblebrox, Marvin the paranoid android, Eddie the computer. In fact, if you have trouble with the game, don't get Infocom's InvisiClues—just buy the paperback *Hitchhiker*. It will get you out of most of the early jams. You should enjoy the game whether you've read the book or not, although reading the book does not make the game a piece of cake.

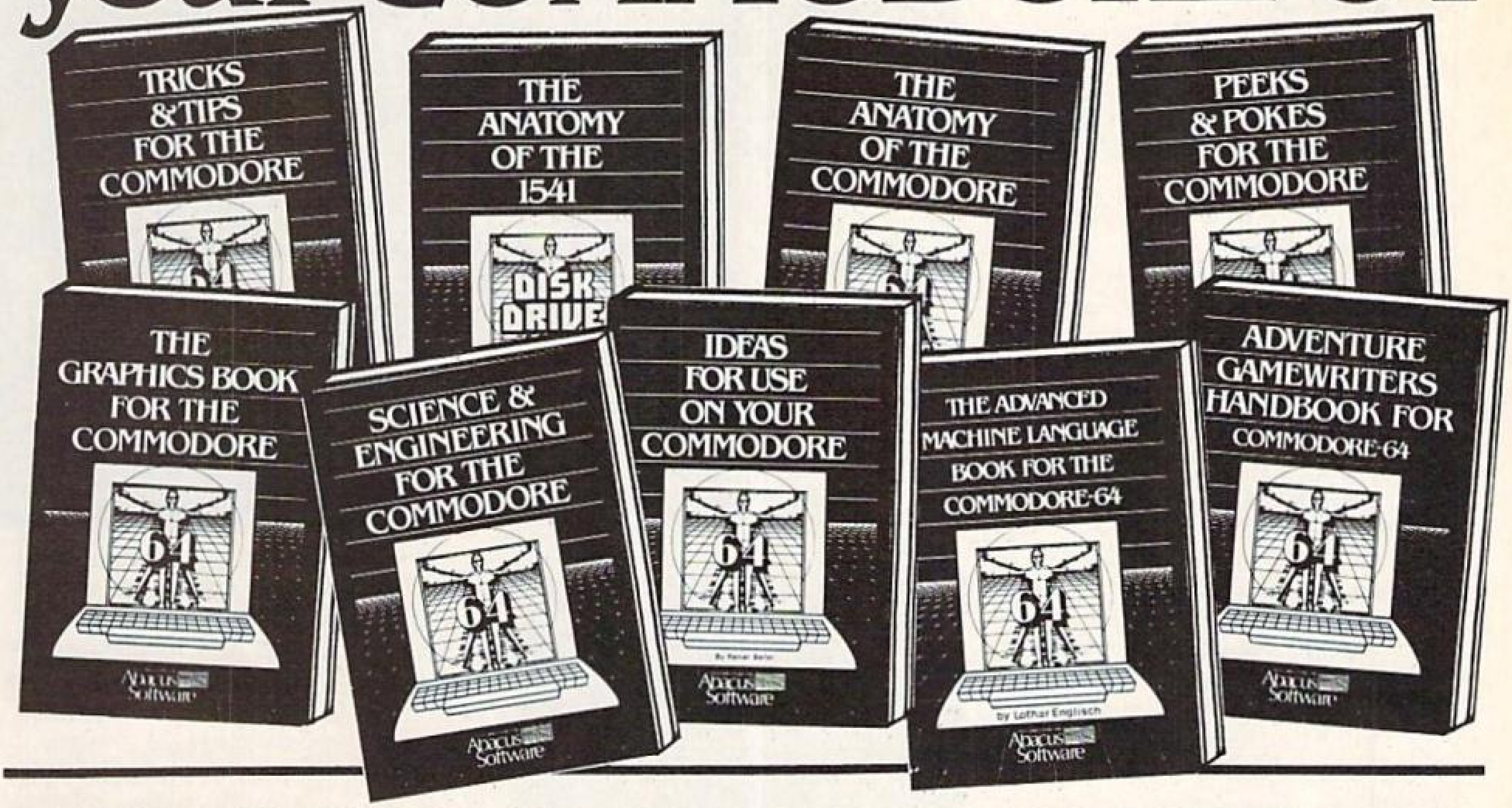
> *If you thought* Planetfall *was funny,* Hitchhiker *is going to make you fall off your chair.*

The story proceeds sequentially. You don't spend the whole game prowling around one location, as in *Deadline*. When you get Arthur out of the house, he'll go to the bar. When you get him out of the bar, he'll get picked up by a spaceship and so on. There's no reason to go back to where you came from, so you don't do a lot of mapping in *Hitchhiker*. There's more of a feeling of moving on a linear progression than in other Infocom games. The puzzles are not the hardest that Infocom has come up with, but they're still pretty tough. They call the game a "standard level" challenge. Not if you haven't read the book, it isn't.

But the most revolutionary thing about this game is that it's a laugh riot. If you thought *Planetfall* was funny, *Hitchhiker* is going to make you fall off your chair. While the humor in *Planetfall* was just a sidelight to the story, the comedy of *Hitchhiker* totally overwhelms the plot and there's nothing wrong with that. Douglas Adams and programmer Steve Meretzkey (who wrote *Planetfall*) have captured the same wacky feeling of the book. In fact, they may have even gone beyond it. After all, we're used to reading funny books. But computer screens are so serious that when something funny comes up on one, it seems even funnier. There's also that feeling that you *caused* that funny thing to happen.

The idea of someone's house being knocked down to build a bypass at the same time as the Earth is being destroyed to build a *space* bypass is funny in itself. But Adams and Meretzky don't take a *single sentence* seriously. From the moment you wake up in the morning ("Pity, it's going to be the worst day of your life.") to your frequent death ("You keep out of this, you're dead."), every line is a gag of some sort. If you get stuck in a room and type, "JUMP UP AND DOWN," the computer doesn't say something boring like, "NOTHING HAPPENS." It says, "WASN'T THAT FUN?" And if you can't figure out the solution after about 20 or 30 tries, you'll suddenly be informed that, "FOUR OUT OF FIVE SENSITIVE PEOPLE SOLVE THIS PUZZLE RIGHT AWAY." It's like interactive Monty Python. If you enjoy British humor at all and even if you *hate* British humor, you'll love *Hitchhiker*.

Required Reading for your COMMODORE 64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Circle Reader Service No. 1

REVIEWED BY ARNIE KATZ

Berserker Raids

Computer: Computer 64
Publisher: Baen Software
Simon & Schuster
1230 Avenue of the
Americas
New York, NY 10020
Medium: Disk

Fred Saberhagen's novels and short stories about the Berserkers have built an enormous following among science fiction fans over the last two decades. Now users can journey to this famous author's world of the future and fight against the relentless war machines which hope to destroy all human life in the universe.

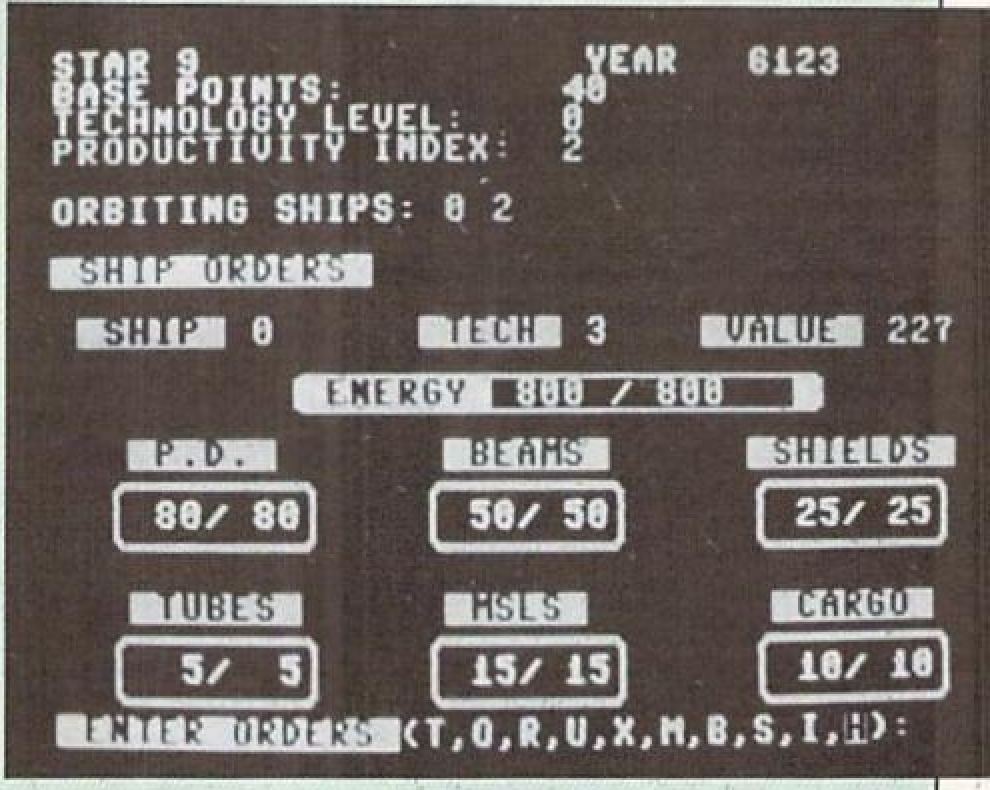
Now users can journey to this world of the future and fight against the relentless war machines which hope to destroy all human life.

Berserker Raids offers ten scenarios plus a build-a-game option, all of which depict confrontations between one or more robot killers and a human civilization. In the four solitaire scenarios, the humans build colonies and construct a space navy powerful enough to defeat the Berserkers. The remaining six scenarios incorporate the idea of factionalism within the human camp. Players must decide whether to cooperate against the Berserkers before squaring off in a final showdown or try for a quick knockout against the rival human force before the Berserkers actually get into the fight.

Strategy, rather than action, is the main event here. The player is more concerned with orchestrating the humans' wartime economic build-up than the details of ship-to-ship combat in space.

The graphics, limited to charts and a simple map of the space section, are strictly utilitarian. Designers Lloyd Johnson and Fred Saberhagen have made little effort to spice up their creation with state-of-the-art audio-visual effects. The title screen includes a crude target-shooting sequence, but it does little to liven up the game.

The 64-page, hard-cover, spiral-bound instruction book includes a Trial Game as a tutorial for novices. Though the gamer will quickly learn to defeat the tutorial's relatively puny pair of invading Berserkers, this practice scenario teaches the routine of play and promotes familiarity with the complex inter-relationships among colonization, manufacturing and militarization.



```
STAR 9                        YEAR   6123
BASE POINTS:                  40
TECHNOLOGY LEVEL:             0
PRODUCTIVITY INDEX:           2

ORBITING SHIPS: 0 2

SHIP ORDERS

 SHIP  0          TECH  3        VALUE  227

               ENERGY  800 / 800

    P.D.               BEAMS            SHIELDS
  80/ 80              50/ 50            25/ 25

   TUBES               MSLS              CARGO
    5/  5             15/ 15            10/ 10

ENTER ORDERS (T,O,R,U,X,M,B,S,I,H):
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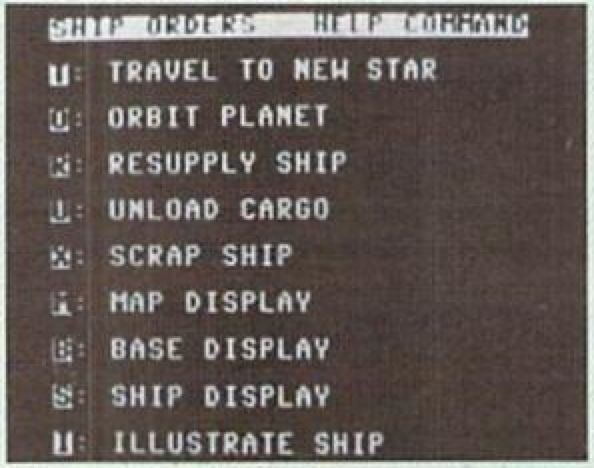

```
SHIP ORDERS    HELP COMMAND

T: TRAVEL TO NEW STAR
O: ORBIT PLANET
R: RESUPPLY SHIP
U: UNLOAD CARGO
X: SCRAP SHIP
M: MAP DISPLAY
B: BASE DISPLAY
S: SHIP DISPLAY
I: ILLUSTRATE SHIP
```

Prior to the start of any non-standard scenario, including the Trial Game, parameters must be entered on a special screen. (In the case of the ten prepared scenarios, parameters are automatically set when the user loads the code.) This establishes such factors as the design of defending ships, the number and power of Berserkers and the year in which the Berserkers make contact with the star cluster.

A player can file a roster of ten ship designs for use in subsequent scenarios. The disk comes with a bank of five standard ships plus room for a like number of customized craft.

Each game-turn represents a year of activity. The human defender thus has a number of rounds to get his or her society into high gear before the enemy launches the first attack.

The point-value of a base reflects its ability to build and repair ships and conduct offensive or defensive warfare. Only a base with at least 40 points can produce and fully overhaul spaceships. Transports must deliver cargo to less powerful bases, called colonies, before they can construct ships.

A base's technology level, which ranges between zero and eight, governs the combat effectiveness of ships built there. That is, a completed ship embodies the technological level of the base at which it was manufactured.

The productivity index, a number between one and three, determines how rapidly a base can produce a ship. A facility with an index of three puts a ship together three times faster than an index-one base. An individual base can construct only one ship at a time and no defending force can consist of more than ten ships.

Resource allocation is the program's main economic mechanism. At the start of a turn, the player decides what percentage of each base's resources should be earmarked for technology, productivity and ship construction.

Every ship is rated for energy, power drive, shields, beams, missile-launch tubes, missiles and cargo capacity. These factors are summarized

Continued on pg. 122

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Circle Reader Service No. 2

REVIEWED BY JOYCE WORLEY

Play Writer: Adventures in Space

Computer: Commodore 64
Publisher: Woodbury Software
127 White Oak Lane
Old Bridge, NJ 08857
Medium: Disk

The computer takes on a different role in this unusual entertainment program for youngsters. Instead of just playmate, competitor or instructor, the microprocessor is now a cheerful collaborator that helps kids create stories of their own, then does the editing and fine-tuning until the masterpiece is finished. Finally, the computer prints the novelette into its finished form, to create a personalized hard-cover book, complete with illustrations, title and dedication pages.

Play Writer: Adventures in Space is more than just a story-telling aid. The program guides the user through the creative process, to complete an exciting space yarn. The interactive story on disk is a bare-boned outline, waiting to be filled in by the junior novelist. By answering a series of questions, the user chooses the direction of the plot, which contains many possible twists and turns.

There are two possible titles to choose between, "The First Kid in Outer Space" and "The Space Journey of Me," or the novelist can make up one. Then the author enters personal information, as well as details about the hero or heroine of the space adventure. Chapter by chapter, the story takes form as it's fleshed out by these entries. The author chooses names and descriptions for all the characters, gets to decide courses of action for the novel's star and selects the directions for the plot twists.

The six-chapter novel is then ready to edit—correcting misspellings, typographical errors or even completely altering part or all of the story—using a simple word processor that's built into the program.

The story itself is a simple tale of space exploration and adventure, but because of the variations available through multiple-choice opportunities and even situations that allow the writer to create personalized plot twists, there's a great deal of leeway in how each version turns out.

After the story is completed and edited, it's saved to disk, available to be read or re-edited at will. But there's more—and this is the exciting part. With a printer, the program actually creates a hard-covered book. The package includes printing paper and colored stickers for illustrations to be inserted into the spaces automatically provided in the finished copy. The package itself turns into the hardcover binding, so that the finished product is a personalized book, complete with title page, dedication and even a page about the author.

Naturally, only one of these hardcover books can be created with the materials included with the program, so it's important to make sure the story is exactly right before the finished tome is assembled. But Woodbury also makes refill kits available, complete with a new hard-cover binding, paper and more illustrations, for $9.95 a set. And, of course, there's no limit to the number of stories that can be created, then printed onto regular computer paper and illustrated by left-over stickers, pictures clipped from magazines or even drawn by hand.

The program is completely self-explanatory and requires only minimal parental guidance to get kids started. Younger users may need some assistance when they start to use the built-in word processor to edit the story, but it's such a simple maneuver that they'll swiftly be in control.

Although *Play Writer: Adventures in Space* is recommended for kids from age seven upward, lots of parents will also get a bang out of completing one of these novelettes. It's a lot of fun to enter either serious or zany data, then read the finished story. And since each telling of the tale is different because of all the plot variations available, kids will want to create many different stories before they choose the best one to turn into a hard-cover novel which then becomes a handsome volume to show to their friends.

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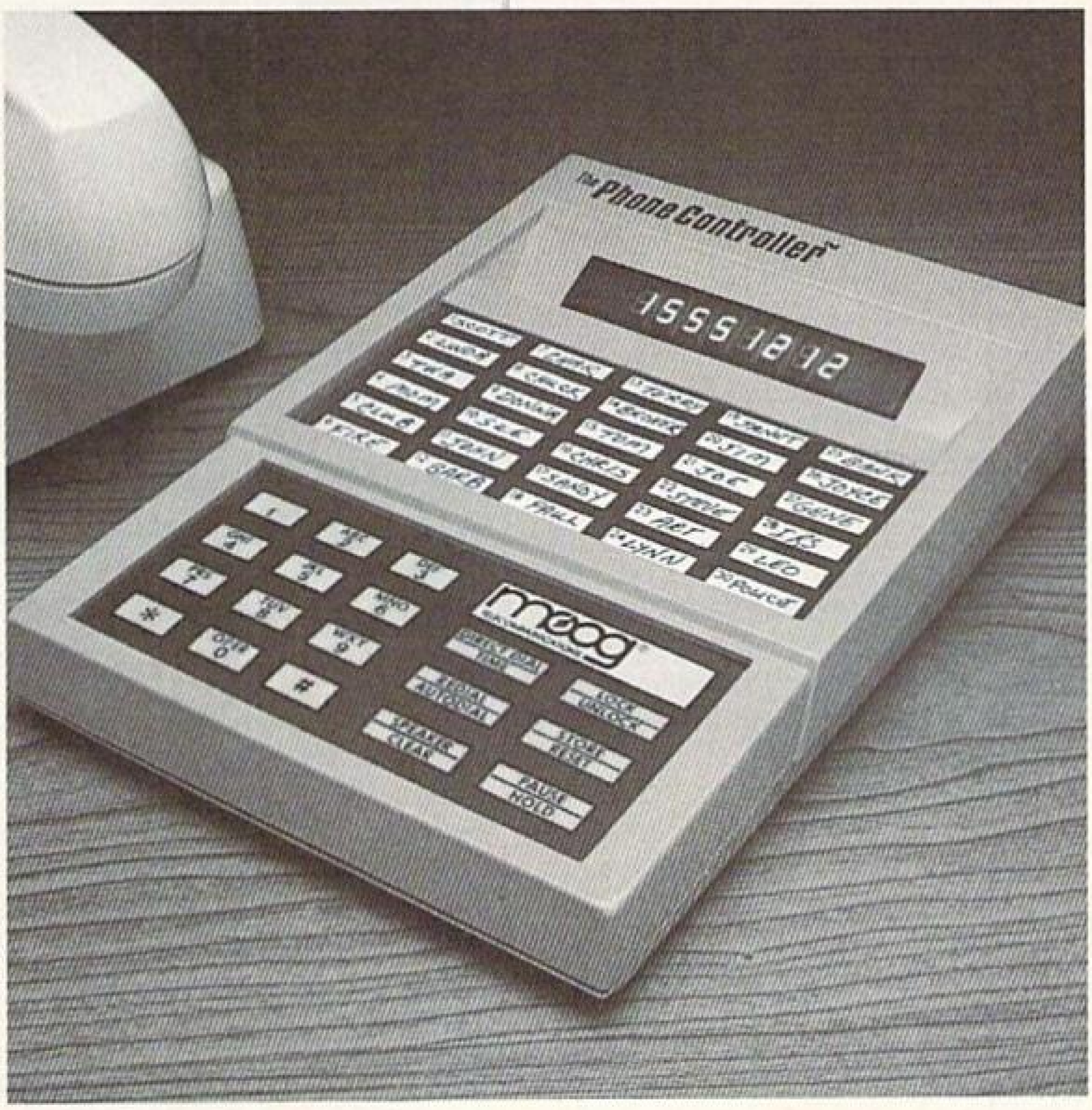

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BEHIND THE PROGRAMS

BY TOM BENFORD

"Close Enough" is Not Enough:

Access Software's Bruce Carver

Most of you don't know who Bruce Carver is, but you're probably well acquainted with the products of his company. Bruce is the president of Access Software, Inc., and also the programmer responsible for the company's biggest hits. The firm has had tremendous success with their releases for the Commodore 64, most notably *Spritemaster 64*, *Neutral Zone*, *Master Composer*, *Scrolls of Abadon*, the immortal *Beach Head*, and most recently, *Raid Over Moscow*. Of these, Bruce authored *Spritemaster*, *Neutral Zone*, *Beach Head* and *Raid Over Moscow*. I caught up with him at the Winter Consumer Electronics Show last January and we had an interesting chat.

"The DICTATOR Strikes Back!"
BEACH-HEAD
ACCESS

Bruce Carver (l.) shakes hands with brother Roger (r.), who did the programming on Beach Head II

LIZ BENFORD

Benford: Bruce, I'd like to get some background information on you. How did you get started in the software business?

Carver: I started out as a professional engineer—I have a PE license. I've always been interested in math and I got into computers in college. I played around a little with FORTRAN, then after college I went to work for a company in San Francisco. They had a computer that no one knew how to work. One day the boss dropped a pile of manuals on my desk and said, "Learn how to work this thing—I see you've taken FORTRAN in college."

I dug through the books until I figured out how it worked and programmed a lot of it myself. By that time, I was working in machine language, something I had never done before—I was used to working with high-level languages. At that point, I fell in love with computers.

Seven years later, I was still an engineer, but I wasn't working with computers at my job anymore. In order to continue my programming I had to do it on my own time.

Then in 1981, when the Commodore 64 came out, I talked my wife into letting me buy one. I started playing around with it and I got super excited—I'd stay up all night long playing with the machine. Then I developed *Spritemaster*, my very first program. I showed it to a local guy—the fellow I bought my 64 from—he works for me now. He liked it and felt we could market it. So we did, starting off with a garage-type operation and building it from there.

Benford: Where did you go from there, Bruce?

Carver: I decided to write an arcade-style video game—I had never done anything like that before. That's how *Neutral Zone* came about. It took about six months to complete it.

By the time *Neutral Zone* was finished, I knew more about what I was up against, so we planned the development of *Beach Head*. *Neutral Zone* had sort of "evolved" while I was learning about the machine, whereas I had definite ideas for *Beach Head*, so it was well planned out—storyboards, flow charts, we did everything the way we're supposed to. The result was a deeper, more complex, more organized game.

I learned a lot from that also, so when we started on *Raid Over Moscow*, we did the same things, but on a deeper level—more strategy and more complexity with a similar concept.

I've just recruited my brother, Roger, who used to be in the Navy. He and I are almost identical in the way we think and program. It's incredible, because I didn't know that until I hired him—he's working on *Beach Head II*.

With *Beach Head II*, we sat down and laid it all out beforehand. We also wanted to be innovative, so we incorporated head-to-head play and voice simulation...we want to stay on the leading edge of technology. It will be the quality and then some of *Beach Head* and *Raid*, but will go a few steps further by adding new elements—we're really excited about it!

Benford: Looking at *Beach Head*, I'll bet you were in the service, perhaps Vietnam—right?

Carver: No, but I've always been into war movies on TV, even in black and white—I always liked them. My accountant and friend, who is also a video-game freak, Chris Jones, shared the same interest—always playing with tanks and watching war movies on TV as a kid. *Beach Head* was spawned from this interest in war movies, essentially.

Benford: You also have a music program, *Master Composer*, in your product line. How did that come about?

Carver: That program was produced by a guy named Paul Kleimeyer in Salt Lake City. He came to me one day and said, "Here's my program—take a look at it." I did look at it and I thought it was very interesting. It needed a few things, so I made some suggestions.

Everything available for music programming at that time had very slow and tedious entry. *Master Composer* had a *fast* entry format and it was very flexible and versatile without a large amount of memory consumption. Additionally, the program could produce a *module* that even a seven year-old could incorporate into his BASIC program to produce music.

It was so clean and well done that I thought it would appeal to the serious programmer who wants to use music in his programs. It doesn't have the "splashy stuff" of other music programs; like *Spritemaster*, *Master Composer* appeals to the true program *builder*—the programmer who wants to create and use the best tools available. While it doesn't sell anywhere near what some of our hit game programs do, those who are using it call me up and say it's the greatest music program they've used.

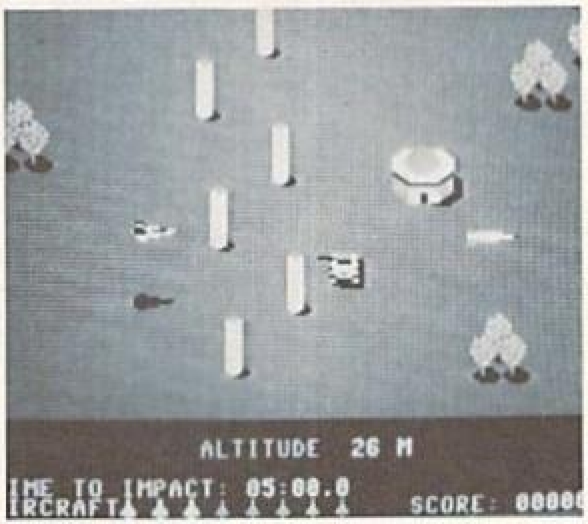
Benford: *Scrolls of Abadon* is another radical departure from your usual bill of fare. Care to speak about it?

Carver: *Scrolls of Abadon* was targeted for the younger age group. I still get letters from mothers who write that their husbands play *Beach Head* and *Raid Over Moscow*, but the kids love *Scrolls of Abadon*.

For some reason, though, the general public is missing the message. *Don't* buy *Scrolls of Abadon* expecting another *Beach Head*—it's not! We don't want anyone purchasing what they think will be a serious strategy game to be disappointed. It's intended for the younger kids and it's a great game for them—that's the point we'd like to get across.

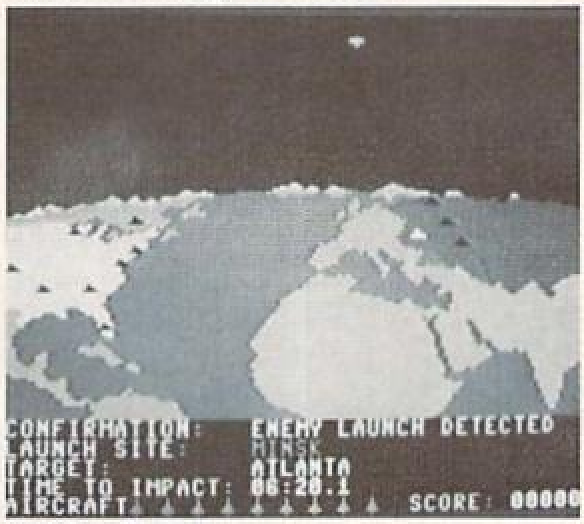
Benford: Aside from *Beach Head II*, do you have any other new products you can talk about at this point in time?

Carver: Yes, we have *Mach IV*. That started out as an experiment with us. We have some very talented programmers working with us, and we decided to explore the possibilities. It is a fast loader, provides 4K *expansion* to the BASIC work area and features a disk cataloger utility—nothing fancy, but it provides a nice, clean way to keep track of your disks. Since we're still working on it, I can't divulge more at this point.



Raid Over Moscow.

"'Close enough' is a term we don't use in this company, because it's that attention to detail that really counts."



Raid Over Moscow.

Benford: In slightly over two years, you've developed Access from a "garage" operation into a very successful software company in the Commodore market. What do you think contributed to this success?

Carver: We take great pains with our products, to make sure they're the highest possible quality. Equally important, we try to be nice to people as we go along. I really feel successful when I read the warranty cards sent in by consumers with things like "the greatest game ever" written on the comment line. The other day a kid came into the office and stuck his hand out to shake mine. Those, for me, are the rewards I'm looking to get. Those constitute *real success*.

Benford: Are you interested in seeing other people's work—perhaps being a publisher for other talented programmers?

Carver: We look at *everything* that anybody sends us. It's interesting to note that there's so much junk, though—I don't know where all the good programmers are going. We have a standard of excellence to maintain, and we haven't seen anything recently that meets our criteria.

You know, in this business you can build a reputation over years and wreck it in weeks. Because of this, we approach things cautiously. But we *do* look at everything sent in and give it consideration.

Benford: Do you have any advice you're willing to offer our readers who may want to pursue a career in software development?

Carver: Sure, and it's quite simple, really. Don't settle for anything less than the best. Spend your time and pay your dues with your programming. Start out with a good idea and carry it through.

The problem is with people being in a hurry to get done with it—they don't spend the time to put that little extra pixel in the right spot. They think it's "close enough." "Close enough" is a term we don't use in this company, because it's that attention to detail that really counts. If that's present, then a person is pulled into the game. As he plays, his palms start to sweat; you can see him leaning with the joystick. If you asked him why, he probably couldn't tell you exactly, except that he's really "getting into it."

I can tell you why, though. It's that attention to detail that makes you feel like you're really *there* instead of watching it on a screen. That's the magic of it all—to take a two-dimensional screen and create the illusion of an environment. But one pixel in the wrong place, one bomb that doesn't get smaller when it's supposed to, some jerky motion, and the illusion is shattered—his brain doesn't believe it anymore. If you can convince the brain, then you've got him.

I know some very good programmers who just don't have the "stick-to-it-ive-ness" that's necessary. They'll get down to the last leg, they're in a hurry to get done and they say, "That's close enough." That's the downfall right there. You *have* to stay with it right to the end. That's the secret of it all. ◼

BY RONALD J. THIBAULT

Flip 64

A Game of Othello for the Commodore 64

This program originally appeared in the Fall, 1982, issue of *Power/Play* written for the VIC 20. This version is modified to run on the Commodore 64. The game is a variant of the game of Othello.

You can choose the size of your playing field to range from four-by-four to ten-by-ten squares, and you can play against another player or the computer. If you play against the computer, the times between moves at the higher skill levels can get very long.

The object of the game is to trap squares of your opponent's color between two of yours horizontally, vertically or diagonally, without any blank squares in between. When this happens, all the squares in between change to your color. You can move only if you can capture at least one of your opponent's squares. The player who has the most squares at the end of the game wins.

Flip 64

```
7 PRINT"[WHITE,CLEAR,DOWN5,RIGHT13,
  RVS]VIC FLIP-64"'BAXK
8 PRINT"[DOWN5,RIGHT10,RVS]
  FORMERLY VIC FLIP-IV"'BANN
9 PRINT"[DOWN,SPACE3]BY JIM
  DUBROUILLET AND SEAN SMITH[DOWN]
  "'BACR
10 PRINT"[SPACE2]MODIFIED FOR THE
   C-64 BY R. THIBAULT[DOWN6]"'BATH
15 PRINT"INSTRUCTIONS (Y/N)?";'BBHI
16 GET A$:IF A$="" THEN 16'EHOG
17 IF A$="N" THEN 21'DEAG
18 IF A$><"Y" THEN 16'EEMI
19 GOTO 2001'BEAH
21 INPUT"[CLEAR,DOWN4]NAME";A$
   :INPUT"ANOTHER";B$:DIM A$(1):X=1
   :Z=1'FTTK
22 IF LEFT$(B$,3)<>"COM" THEN 25'FINF
23 A=VAL(RIGHT$(B$,1))-1
   :LF=-(A=0)*999-(A=1)*25-(A=3)*.63
   :CO=1:GOTO 26'QPOU
25 IF RND(1)>.5 THEN C$=A$:A$=B$:B$=C$
   :DIM A(8)'IYAM
26 PRINT A$"WHITE OR BLACK";:INPUT C$
   :IF C$="B"THEN C$=B$:B$=A$:A$=C$
   :CO=2*CO'KEFU
28 INPUT"# ACROSS";N:INPUT"UP & DOWN";
   O:A$(1)=A$:A$(0)=B$:V=15'FAFS
29 N=2*INT((INT(-((N<11)AND(N>2))*N-
   (N>10)*10-(N<4)*8))/2)'QIOY
30 C$(0)="[BLACK]":N1=2*INT(INT(-(
   (O<11)AND(O>2))*O-(O>10)*10-(O<4)
   *N)/2)'RNKS
31 PRINT"[CLEAR]":O=N-1
   :C$(1)="[WHITE]":DIM D(8),D2(8),
   S(1)'FBLJ
32 FOR A=0 TO 8:READ D(A):NEXT
   :DATA-41,-40,-39,-1,0,1,39,40,
   41'GMJL
33 S(0)=2:N3=N/2:N4=N3+1:N5=N1/2
   :N6=N5+1:N7=N3*N5:N8=N7'MPGT
34 FOR U=1 TO 4:IF INT(INT(N7^(1/U))
   ^U)=N7 THEN N8=INT(N7^(1/U))'PCNS
35 NEXT:N7=N8:FOR A=1 TO 2*N1 STEP
   2'HMBL
36 FOR B=1 TO 2*N STEP 2:E=1064+40*A+B
   :POKE E-41,207:POKE E-40,208'NGKU
37 POKE E-1,204:POKE E,250:NEXT B,A
   :PRINT"[HOME,DOWN,RIGHT]";'FSNN
38 S(1)=2:S(0)=2:FOR A=55296 TO 56295
   :POKE A,5:NEXT A'HEFR
39 GOSUB 3000:REM SOUND'CKLL
40 FOR A=1 TO (N1-1)/2:PRINT"[DOWN2]";
   :NEXT:PRINT"[LEFT2]"'IMGI
41 FOR A=1 TO O/2:PRINT"[RIGHT2]";
   :NEXT'GHWG
42 PRINT"[RVS,WHITE,SHFT O,SHFT P,
   BLACK,SHFT O,SHFT P,DOWN,LEFT4,
   WHITE,SHFT L,SHFT @,BLACK,SHFT L,
   SHFT @,DOWN,LEFT4,SHFT O,SHFT P,
   DOWN,LEFT2,SHFT L,SHFT @,WHITE,
   SHFT L,SHFT @,UP,LEFT2,SHFT O,
   SHFT P]":C=1'CDNB
50 C=-(C=0)'DFWE
51 PRINT"[HOME,SPACE21,HOME]
   "C$(C)A$(C)"[BLACK]"S(0)"[WHITE]
   "S(1):IF W1=4 THEN 100'EACM
55 IF CO>0 AND CO-1=C THEN 300'GKXM
60 GOTO 117'BDID
100 PRINT"[WHITE,HOME,DOWN23]";A$;
    S(1)'BIGX
101 PRINT"[HOME,DOWN23,RIGHT20]";B$;
    S(0)'BINC
102 BC=1:BB=0:FOR XX=0 TO 21
    :POKE 53280,BC:POKE 53281,BB:TT=BC
    :BC=BB:BB=TT'KVMO
103 FOR YY=0 TO 40:NEXT YY
    :NEXT XX'FLVD
104 POKE 53281,6:POKE 53280,14
    :GOSUB 3000:REM END OF GAME'EGGI
105 PRINT"[HOME,DOWN24]
    PLAY AGAIN?"'BAQF
106 GET C$:IF C$><"Y" AND C$><"N"
    THEN 106'IKXI
107 IF C$="Y" THEN 21'DEIF
109 CLR:PRINT"[CLEAR,WHITE]";:END'DDCG
117 QZ=55334+2*X+80*(Z-1):QW=QZ-54272
    :R=PEEK(QZ) AND 7:GOSUB 140'MLCT
118 POKE QZ+1,C:POKE QZ+40,C
    :POKE QZ+41,C:POKE QW+1,127
    :POKE QW+40,127'KLES
119 POKE QW+41,127:POKE QZ,C'DNEJ
120 POKE QW,127:P=PEEK(56320)'DPIC
121 X=X-((P AND 8)=0)+((P AND
    4)=0)'HQPG
125 Z=Z-((P AND 2)=0)+((P AND 1)=0)
    :GOSUB 140:POKE QZ,R:POKE QW,207
    :POKE QZ+1,R'MNPS
126 POKE QZ+40,R:POKE QZ+41,R
    :POKE QW+1,208:POKE QW+40,204
    :POKE QW+41,250'KOHS
127 IF (P AND 16)><0 AND C$><"F" THEN
    117'ILOL
130 GOTO 1000'BEXY
140 GET C$:X=X+(C$="J")-(C$="K")
    :Z=Z+(C$="I")-(C$="M")'LYVM
141 Z=(Z+(Z>N1)-1)*-(Z>0)+1
    :X=(X+(X>N)-1)*-(X>0)+1
    :RETURN'RGQS
200 B=PEEK(F-54272):IF B><207 THEN
    FL=FL-D2(A):D2(A)=0:GOTO 1014'LKUK
202 GOTO 1011'BEAY
300 X=0:Z=0:FM=0:SA=0:HV=-9:X2=0:Z2=0
    :MF=0'JEVK
302 SA=SA+1:X=X*-(X<N)+1:Z=Z-(X=1)
    :QZ=55334+2*X+80*(Z-1)
    :GOTO 1000'RQVU
303 IF FL>0 THEN 405'DGLD
305 IF MF=0 AND SA=N1*N THEN W1=W1+1
    :GOTO 50'JQRL
306 IF SA<N1*N THEN 302'EIJH
310 FOR A=0 TO 8:D2(A)=A(A):NEXT:X=X2
    :Z=Z2'HWMH
311 FL=MF:E=55334+2*X+80*(Z-1)
    :GOTO 1020'IYHJ
405 CA=LOG(ABS((X+(X>N3)*N3+(X<N4)*N4)
    *(Z+(Z>N5)*N5+(Z<N6)*N6)))/LOG(N7)
    'STAA
406 CB=(CA<>INT(CA)):VL=(CB-(CB=0))
    *CA+FL*CA*LF'LFES
407 XZ=0:IF VL>HV OR (VL=HV AND
    FL>MF) THEN XZ=1'JVDQ
408 IF XZ=1 THEN HV=VL:X2=X:Z2=Z
    :FOR A=0 TO 8:A(A)=D2(A):NEXT
    :MF=FL'MKQW
409 GOTO 305'BDHI
1000 FL=0:E=QZ:DX=135'DNMX
1001 IF (7 AND PEEK(E))<2 THEN ON
     1-(CO=C+1) GOTO 1016,303'KWQE
1002 FOR A=0 TO 8:IF A=4 THEN NEXT
     A'HHNA
1005 D2(A)=0'BGIY
1006 D2(A)=D2(A)+2'CLHC
1007 FL=FL+2:F=E+D(A)*D2(A)'FRRH
1008 IF (7 AND PEEK(F))>1 THEN
     FL=FL-D2(A):D2(A)=0
     :GOTO 1014'JDRM
1009 GOTO 200'BDBD
1010 IF (7 AND PEEK(F))>1 THEN
     FL=FL-D2(A):D2(A)=0
     :GOTO 1014'JDRF
1011 IF (7 AND PEEK(F))=-(C=0) THEN
     1006'HOQC
1013 FL=FL-2'CFDY
1014 NEXT A'BBTX
1015 IF CO-1=C THEN 303'EHRD
1016 IF FL<1 AND W=3 THEN W=0:W1=W1+1
     :GOTO 50'JQCJ
1017 IF FL<1 THEN W=W+1:C=-(C=0)
     :GOTO 50'JPPK
1020 W1=0:W=0:S(C)=S(C)+1+FL/2
     :S(-(C=0))=S(-(C=0))-FL/2
     :FOR A=0 TO 8'QQQO
1025 FOR Y=0 TO D2(A)-2 STEP 2
     :F=E+D(A)*Y:POKE F,C:POKE F+1,C
     :POKE F+40,C'NHAP
1026 POKE F+41,C:DX=DX+1:NEXT Y,A'FPTH
1027 IF S(0)+S(1)=N*N1 THEN 100'FOOI
1030 GOSUB 3000:GOTO 50'CHTX
2001 REM INSTRUCTIONS'BMRY
2125 PRINT"[CLEAR,DOWN]
     THE OBJECT OF THIS GAME IS TO
     END"'BAEL
2126 PRINT"[SPACE3]WITH MORE SQUARES
     THAN YOUR":PRINT"[SPACE3]
     OPPONENT HAS."'CBUQ
2127 PRINT"[DOWN]YOU ARE EACH A
     DIFFERENT COLOR,"'BAEM
2128 PRINT"[SPACE3]AND START WITH TWO
     SQUARES EACH."'BAXO
2129 PRINT"[DOWN]TO MAKE A LEGAL FLIP,
     PLACE THE CURSOR"'BAGQ
2130 PRINT"[SPACE3]SO THAT 1 OR MORE
     OF YOUR"'BAKF
2131 PRINT"[SPACE3]OPPONENTS SQUARES
     ARE BETWEEN THE"'BAQJ
2132 PRINT"[SPACE3]CURSOR AND ONE OF
     YOUR SQUARES."'BAXJ
2133 PRINT"[DOWN2]DO YOU WANT TO USE
     A JOYSTICK (Y OR N)?"'BATL
2139 GET A$:IF A$><"Y"AND A$><"N"THEN
     2139'ILRP
2140 IF A$="N" THEN 2144'DGXC
2141 PRINT"[CLEAR,DOWN]
     MOVE THE CURSOR WITH THE
     JOYSTICK"'BAYK
2142 PRINT"[SPACE3]UNTIL IT IS IN
     POSITION FOR A":PRINT"[SPACE3]
     LEGAL FLIP."'CBCN
2143 PRINT"[SPACE3]THEN PUSH THE FIRE
     BUTTON.":GOTO 2155'CFIL
2144 PRINT"[CLEAR,DOWN,RVS,SPACE7]
     "'BAWF
2145 PRINT"[RVS,SPACE3,^,SPACE3]"'BABF
2146 PRINT"[RVS,SPACE3]I[SPACE3]"'BAFG
2147 PRINT"[RVS] <J K> "'BAEI
2148 PRINT"[RVS,SPACE3]M[SPACE3]"'BAJI
2149 PRINT"[RVS,SPACE3]V[SPACE3]"'BASJ
2150 PRINT"[RVS,SPACE7]"'BANB
2151 PRINT"[DOWN]THESE KEYS WILL MOVE
     THE CURSOR IN"'BAAL
2152 PRINT"[SPACE3]THE INDICATED
     DIRECTION."'BAGJ
2153 PRINT"[DOWN]WHEN THE CURSOR IS
     IN POSITION,":PRINT"[SPACE3]
     PRESS F."'CBGP
2155 PRINT"[DOWN]IF A LEGAL FLIP,
      COMPUTER WILL FLIP"'BADO
2156 PRINT"[SPACE3]ALL THE SQUARES
     WHICH ARE O.K."'BAIO
```

Continued next page

```
2158 PRINT"[HOME,DOWN21,RVS]
     PRESS ANY KEY TO GO ON"'BAIQ
2159 GET A$:IF A$="" THEN 2159'EJON
2160 PRINT"[CLEAR,DOWN]
     POSSIBLE BOARD SIZES ARE 4,6,8,
     & 10."'BAHL
2161 PRINT"[SPACE3]YOU WILL INPUT
     THESE LATER."'BAPK
2163 PRINT"[DOWN]IF YOU DO NOT INPUT
     A SIZE, THE"'BACM
2164 PRINT"[SPACE3]COMPUTER WILL USE
     8 AS THE SIZE."'BAYO
2165 PRINT"[DOWN,SPACE3]
     4 IS FOR VERY SHORT GAMES."
     :PRINT"[DOWN,SPACE3]
     6 IS FOR SHORT GAMES."'CBJU
2167 PRINT"[DOWN,SPACE3]
     8 IS STANDARD SIZE."'BAIO
2168 PRINT"[DOWN,SPACE3]
     10 IS FOR LONG GAMES."'BAXP
2169 PRINT"[HOME,DOWN21,RVS]
     PRESS ANY KEY TO GO ON"'BAIS
2172 GET A$:IF A$="" THEN 2172'EJJI
2180 PRINT"[CLEAR,DOWN]
     TO PLAY THE COMPUTER,TYPE COM1,
     COM2,"'BAMN
2190 PRINT"[SPACE3]COM3,
     OR COM4 FOR 'ANOTHER'."'BAOL
2200 PRINT"[DOWN]THE HIGHER THE
     NUMBER THE HARDER THE"
     :PRINT"[SPACE3]GAME."'CBSI
2210 PRINT"[DOWN]THE GAME ENDS WHEN
     NO SQUARES REMAIN"
     :PRINT"[SPACE3]GREEN."'CBBK
2220 PRINT"[DOWN]THE COMPUTER DECIDES
     WHO CHOOSES THE":PRINT"[SPACE3]
     COLOR."'CBOL
2230 PRINT"[DOWN2]PRESS ANY KEY TO
     START GAME"'BAAH
2240 GET A$:IF A$="" THEN 2240'EJFE
2250 GOTO 21'BCKB
3000 REM FLIP SOUND'BJQX
3010 SS=54272'BHQX
3020 POKE SS+1,20'CGPY
3030 POKE SS+5,9'CFDA
3040 POKE SS+6,9'CFEB
3050 POKE SS+24,15'CHWC
3060 POKE SS+4,17'CGYD
3070 FOR XY=1 TO 40: NEXT XY'EIMG
3080 POKE SS+4,16'CGXF
3090 FOR XY=1 TO 400:NEXT XY'EJKI
3100 FOR XY=15 TO 0 STEP -1
     :FOR YY=0 TO 20:NEXT YY'JPBF
3110 POKE SS+24,XY:NEXT XY
     :REM LOWER VOL'ETRE
3120 FOR XY=1 TO 24:POKE SS+XY,0
     :NEXT XY:REM CLEAR SOUND'HBOJ
3130 RETURN'BAQY
```

END

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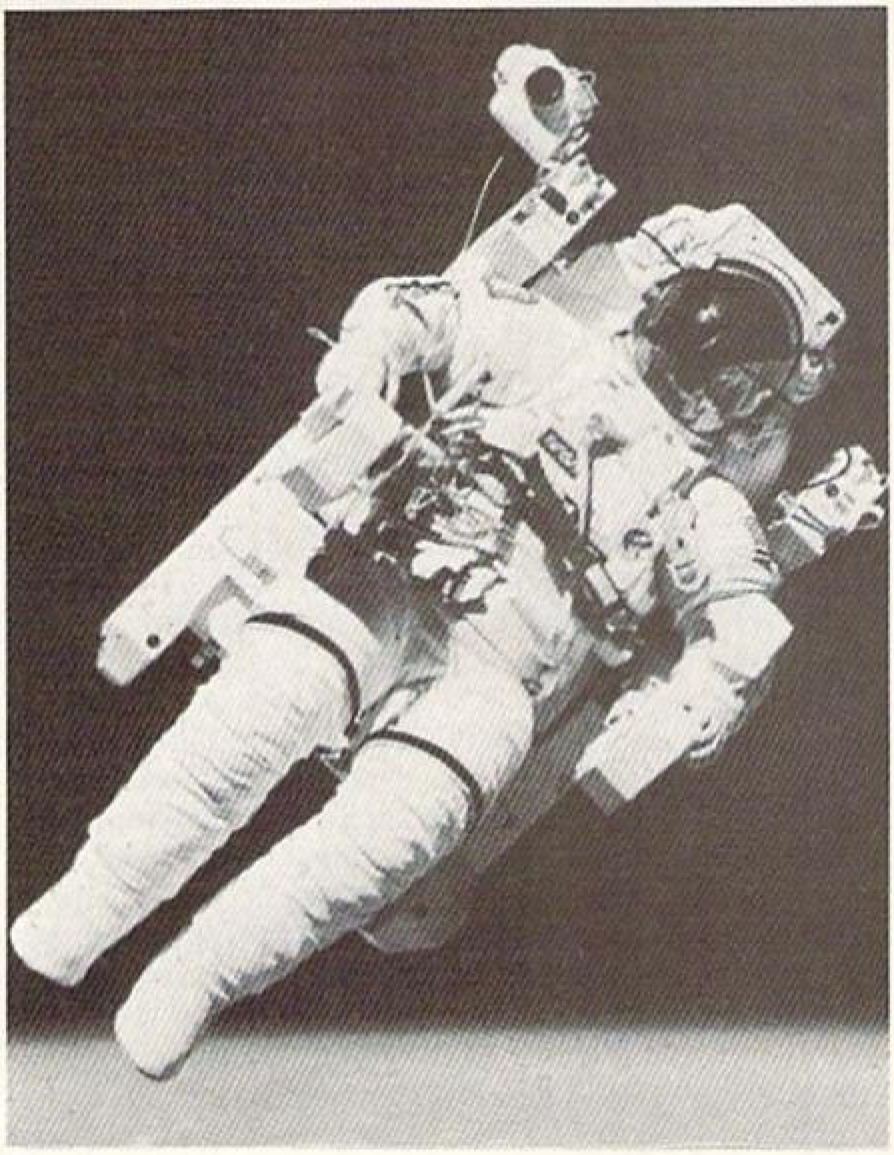
Sky Travel Challenge: Part 3

In the last issue of *Commodore Power/Play,* we posed a challenge to users of *Sky Travel,* Commodore's astronomy program for the Commodore 64. The authors of the program have placed 11 different undocumented "tokens" within the software. If you can figure out, first, what it is you're looking for, and second, each of the 11 different sets of coordinates, and you then place yourself there during the right time period and look in the right direction, you will see each of the 11 different items. For instance, if you figure out that the Washington Monument is one of the tokens, you would put yourself at the coordinates for Washington, D.C. after the year 1884 in order to see it on your screen. (Sorry, that's not one of them, but you get the idea.)

We began in *Commodore Microcomputers* with a set of extremely difficult clues, then offered an easier set in the April/May *Commodore Power/Play.* Here we include both of those sets of clues plus the final—and easiest—set. If you still can't figure them out, look on page 128 for the answers.


NASA

CLUES

1. An alert person should have no trouble finding the bear.
1a. The "Alert" person likely resides in an igloo.
1b. Bear looks due east, sees green land.

2. Stated empirically, if the bear really exists, he gets top billing.
2a. When bear reaches top billing, he detects the odor of gorilla.
2b. The bear also loves large apples.

3. See an angry bear, not one but two, on tour, climb high, higher, highest with no visible means of support.
3a. Away it gives "two on tour."
3b. Not far away is Niagara Falls.

4. Hungry bear, but a half-wit, looks for hamburgers, is disappointed, but we're not, are we?
4a. The bear sees half of a familiar looking landmark in the distance.
4b. Think of a billion hamburgers.

5. Guilty bear is fugitive, is chased by Canadian police force.
5a. The bear may be in Canada, but the "Mountie" is not.
5b. I'm sorry, "fugitive" should have been spelled "fujitive."

6. How do you expect to find the bear if you are looking for a mosque?
6a. Look for a mosque—how would you do that?
6b. Nyet, nyet—stop looking for a mosque.

7. Don't cross this one off, because, although suspenseful, you have to wait until the bear comes to it.
7a. Bear finds gold by figuring out what it is that he shouldn't cross before coming to it.
7b. Bear left his heart there.

8. Betsy says, "Jim, go in and get my pen, and don't worry about the bear."
8a. Betsy is THE Betsy. Her husband has been knighted.
8b. Not a nice place to visit (nothing to see but white), nor would you want to live there (too cold).

9. Bear goes 200 steps north, 200 steps east, 200 steps south, and 200 steps west. What color is the bear?
9a. Bear would be better off if he were a camel.
9b. Tell bear "turn right, peer amid the wall, look for an opening."

10. Bear has party, gets plastered in style.
10a. Plaster is dehydrated calcium sulfate.
10b. I fell off this tower once.

11. The bear may be gentle, but he's still pretty big, so watch out!
11a. Green witch casts spell on bear by saying bong, bong!
11b. Bear can't see what time it is, too foggy here.

While you tear your hair out trying to solve these, we hope that you will learn some geography and astronomy. Good luck!

Answers on page 128

BY JIM LOCKRIDGE

Dice Master for All Commodore Computers

An aid to complex dice games that rolls the dice and tallies the sum automatically.

The Dice Master is a fantasy role-playing aid that does away with a gamer's dozen or so miscellaneous ivories. It's also a fine craps tosser!

In fantasy role-playing games, you may find six-, ten-, twenty-sided dice and more. Dice Master will roll up to 80 times at once. It will automatically tally the sum of all tosses and average them as well.

The program runs silently, a beneficial feature that referees will appreciate.

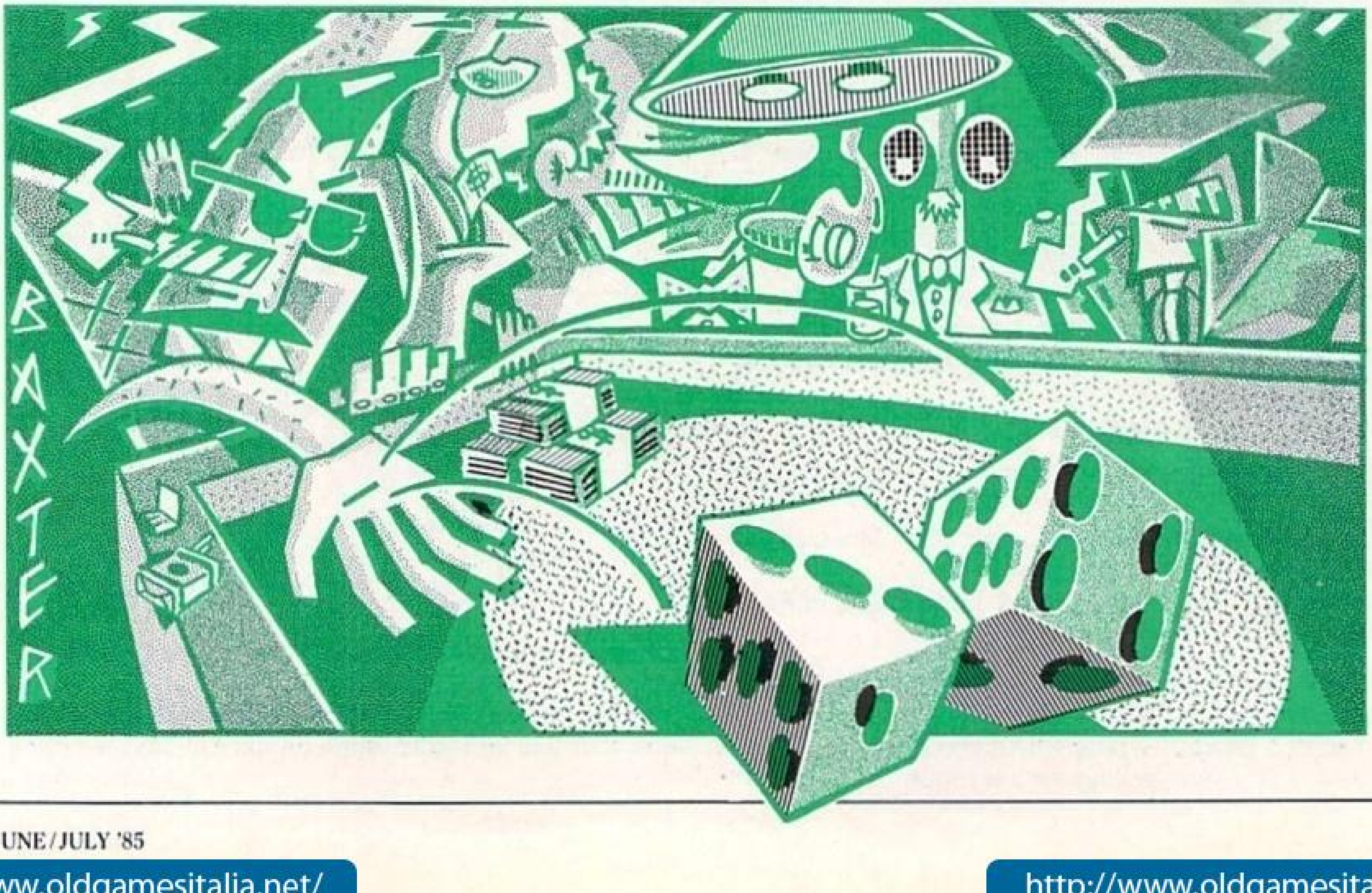
The program will first ask how many sides the die/dice to be tossed has. It will accept any number, although decimals corrupt the results. You must press RETURN to let the computer acknowledge your entry.

Next, it will inquire how many times the die/dice are to be rolled. Any number up to 80 will be accepted. More than 80 tosses would scroll the information at the top of the screen out of sight. Press RETURN, and behold! The results are displayed neatly in four columns and the total with the average appear in the top right of the screen. You may now roll again by simply pressing Y when prompted or N to quit.

Dice Master

```
400 POKE 53280,1:POKE 53281,1
    :PRINT"[CLEAR,HOME]"'DQKD
500 PRINT"[DOWN5]";TAB(14);"[BLACK]
     DICE MASTER "'CFMF
510 PRINT"[DOWN3]";TAB(12);"[BLUE]
     BY JIM LOCKRIDGE"'CFNH
600 FOR T=1 TO 2000:NEXT T'EIUE
700 CLR'BAFB
800 INPUT"[CLEAR,HOME,RVS,GREEN]
    HOW MANY SIDES";A'BCPH
900 INPUT"[HOME,DOWN,RVS,BLUE]
    HOW MANY ROLLS";B:IF B>80 THEN
    900'EJCL
1000 PRINT"[BLACK]"'BAQT
1100 FOR T=1 TO B'DDHV
1200 RDR=INT(A*RND(1))+1'FKOA
1300 PRINT RDR,:SUM=SUM+RDR:NEXT'EPIC
1400 PRINT"[HOME]";TAB(25);"[RVS,RED]
      TOTAL ";SUM'CJXC
1450 PRINT"[HOME,DOWN]";TAB(25);"[RVS,
     ORANGE] AVG.= ";INT(SUM/B)'EMWJ
1500 PRINT"[HOME,DOWN23]";TAB(9);"
     [RVS,CYAN] ROLL AGAIN? Y/N
     [RVOFF]"'CEUH
1600 GET RA$'BDMA
1700 IF RA$<>"Y"AND RA$<>"N"THEN
     1600'HKJH
1800 IF RA$="Y"THEN 700'DGOE
1900 IF RA$="N"THEN END'EDFF
```

END



ART BAXTER

BY PAM HOROWITZ

Finding Free Floppies

There are lots of ways to get your hands on free or very low-cost software—and we don't mean piracy! Thousands of computer programs belong to a category called "public domain," and you can own many of them for the price of a blank disk. Public domain software is a great way to fatten your program collection without flattening your wallet.

Public domain software has no strings attached—no copyrights of any kind. That means that it's perfectly legal to duplicate it. You're free to make zillions of copies and give them to all your friends. There are thousands of programs and many of them are top quality. From utilities to arcade games, public domain software is yours for the copying.

You're probably wondering if public domain software belongs to the "garbage in-garbage out" category. Absolutely not! There are hundreds of good programmers who've written some great stuff but don't think it's ready to sell, so they donate it to the public domain. It's one way for them to become known and to polish their programming techniques before going commercial.

Another reason for going public is that it sometimes doesn't pay to try and market a program which doesn't have universal appeal. Some science programs, for example, are too specific and won't sell in a local computer store. So the authors generously give them to the public domain for others who have the same interest.

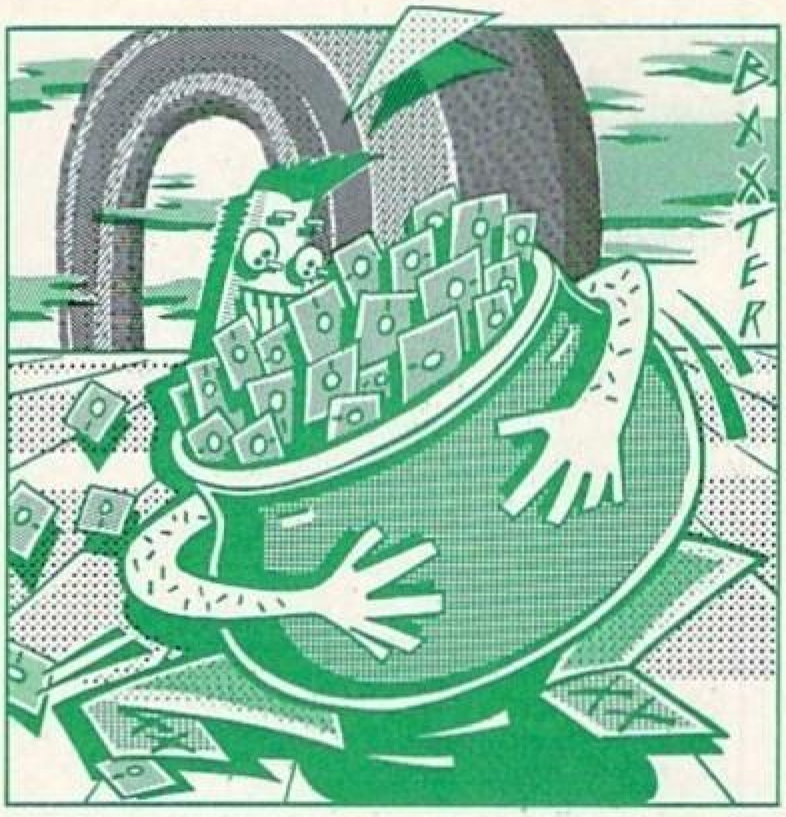
Along with complete programs, users of public domain software can also pick up some terrific subroutines to use in their own programming. It's a great way to learn new programming techniques and to improve on old ones.

Getting the Giveaways

Computer bulletin boards and the Commodore Information Network are great sources of freebie software. The only catch is that you need a modem and terminal software to access and download from them. The Commodore Information Network (CIN) is run by Commodore and is available on the CompuServe Information Service, one of the largest telecommunications networks in the U.S. On CIN you can find over 1,600 public domain titles—all of them yours for the downloading. These programs include BASIC tutorials, music, graphics, terminal programs, utilities and games. Simply log on to CompuServe, type GOCBM and choose any of the three main SIG's (special interest groups) from the menu to locate programs that might interest you.

User groups, another source of software freebies, often make their public domain software available on large subscription networks like The Source, CompuServe and Delphi.

You need a modem and must pay a fee for joining the large networks, but once you do, you'll have tons of free programs to choose from. For more information on subscribing, write to:



Delphi
3 Blackstone Street
Cambridge, MA 02139

The Source
1616 Anderson Road
McLean, VA 22102

CompuServe
5000 Arlington Centre Blvd.
P.O. Box 20212
Columbus, OH 43220

The Computer Phone Book and the *On-Line Guide for the Commodore Computers*, both by Mike Cane, give numbers for private bulletin boards in every state, with hundreds of downloading options. Each entry in the book tells whether a password is required for logging on, if downloadable programs are available, and which computer each program runs on. You should also check to see what kind of terminal software is required by any bulletin board you plan to download from. In addition, the programming SIG on the Commodore Information Network maintains a list of hundreds of bulletin boards, arranged by telephone area code.

No matter where you live, there's bound to be a bulletin board nearby. And if you can afford the long distance charges, your modem can transport you to free software all over the country.

For instance, if you dial the Commodore Public Bulletin Board in Chicago, Illinois (312-397-0871), you'll be logging on to the board with one of the largest selections of downloadable Commodore programs in the country.

Accessing the AstroCom board in New York (212-799-4649) takes you into an electronic city with downloadable programs and a special section devoted to Commodore users.

The Rainbow Connection #1 is another New York board (212-441-3755) which offers downloadable Commodore programs. Choices include adventure and arcade games, astrology and astronomy, graphics, etc. Following is a sample list of additional Commodore-specific boards which feature top quality, downloadable software:

Front Range Commodore Bulletin Board
Ft. Collins, Colorado
(303) 223-4305

Video King
Lincolnwood, Illinois
(312) 674-6502

AVC-Commodore Bulletin Board
Indianapolis, Indiana
(317) 255-5435

Commodore Communications
St. Louis, Missouri
(314) 625-4576

Commodore Central
Holladay, Utah
(801) 277-3913

Northwest Commodore User's Group
Edmonds, Washington
(206) 743-6021

C.U.S.S.H.
Milwaukee, Wisconsin
(414) 554-9520

Commodore Bulletin Board
Cheyenne, Wyoming
(307) 637-6045

Star Text Metro
Dallas/Fort Worth, Texas
(817) 390-7832 (information)

Several user groups will direct-mail their public domain software to you for a small fee. You can request their catalogs and send away for some super software. The Jefferson State Users Group (JUG) in Oregon is one of many groups offering public domain software by mail. JUG has over 800 programs for the Commodore 64 and PET computers. If you'd like to browse through their catalog, write to either Ken Crouse or Mike Miller, c/o Interstellar Electronics, 1309 N.E. 6th Street, Grants Pass, Oregon 97526. The catalog has names of programs according to category (utilities, computer science, education, games, etc.) along with a brief description of each. JUG charges $6.00 each for their public domain disks.

Compucats is a Commodore user group based in Aberdeen, Maryland. It was started by two Commodore game designers in 1983 and offers information and free software to owners of Commodore 64's. You can get their "disk of the month" for $6 (or a tape for $5). Each contains an assortment of public domain Commodore programs. Some of the titles in the Compucat collection include: Startrek, Goblins, Christmas Cards (graphics and music), Doctor Dementia and Word Hunt.

To joint the Compucats, write to: The Compucats, Compucats Software Development Company, 680 West Bel Air Avenue, Aberdeen, Maryland 21002. Membership costs $15 a year for Maryland residents and $20 for out-of-staters and includes a subscription to the "Compucats Chronicle," a 40-page monthly magazine.

For a super selection of Commodore giveaways, contact the Toronto PET Users Group (TPUG), 1912A Avenue Road, Suite 1, Toronto, Ontario, Canada, M5M 4A1. This group has more than 4,000 programs in its public domain library. They'll mail the programs to you at a cost of $10 per disk or $6 per tape. (There are between 15 and 62 programs on each.) After you pay your membership fee of $30 (local) or $20 (associate-North American), you'll receive a 24-page catalog of public domain programs available for your Commodore computer.

The ABACUS Commodore Club in Bakersfield, California, offers software personally designed by Gene Smith, the Sysop (systems operator) of the Bakersfield Commodore Bulletin Board. Gene says he programs software to fit personal requests. These include bulletin board software to help users start their own boards, disk backup routines and file converters. For more information, write to: Gene Smith, ABACUS-COM, 2316 Sandy Lane, Bakersfield, California 93306.

Public Domain Software, Inc. is a public domain source not affiliated with clubs or bulletin boards. Their catalog costs sixty cents and is worth every penny. In addition to listing hundreds of programs for the Commodore 64 and VIC 20, the catalog has several pages of helpful hints which tell how to get rid of those annoying wavy lines on the screen, how to store tapes and disks, etc. Each disk from Public Domain Software costs $5.00 and contains approximately 20 titles and a description of what they do. For a copy of the catalog, write to: Public Domain, Inc., 5025 S. Rangeline Road, West Milton, Ohio 45383.

For another good source of practically free software, contact The Friendly Computer Shop, 78 Main Street, Littleton, New Hampshire, 03561. For $25, you can get one of their "Almost-Free Software Paks." Every pack has approximately 60 programs for the Commodore 64 and each has been personally debugged by the company. In many cases, they've even enhanced the programs with additional sound, color and graphics. A sample pack contains programs like Blackjack, Labyrinth, Frog, Checkers, Artillery, Concentration and many more.

The American Software Publishing Company, P.O. Box 57221, Washington, D.C., 20037, also has a collection of public domain programs for the VIC 20 and Commodore 64. Their catalog is free and programs are available on either disk or tape. They're sold in volumes of approximately 50 programs at a cost of $44.95 for cassette and $75 for disk. Included with each volume is a handy guide containing tips for loading and using the software.

Public domain is the way to go if you don't want to spend megabucks building a software collection. You'll be pleasantly surprised at the quality out there, whether you choose to order by mail or let your modem do the walking. ■

BY CALVIN C. GUILD

GET-PRINT

A Screen-to-Printer Utility Program for the Commodore 64 and VIC 20

By using OPEN 1,3 and GET# statements, you can convert the screen of the Commodore 64 or VIC 20 into an input device for the printer. Add a few controls to format the printer output and you have a fast screen-to-printer routine that occupies less than 200 bytes of memory.

First, the screen is opened as an input device and then the printer is opened as an output device: OPEN (file no.),(device no.). File numbers can be any number up to 255, but good practice is to use only file numbers below 127. The higher file numbers are reserved for special purposes.

In lines 7010-7020, the number 25 is the number of screen lines. You may use up to 25 for the Commodore 64 and up to 23 for the VIC 20. When you use less than the maximum number of screen lines, only that part of the screen is printed. In line 7020, the number of columns on the screen must be specified: 40 for the Commodore 64 and 22 for the VIC 20. Lines 7030-7050 control the printer line spacing to suppress the automatic RETURN command picked up from the screen by the GET# statement.

Line 7060 closes the printer and screen to end the subroutine. The RETURN in line 7060 assumes entry to the subroutine via a GOSUB 7000 command or statement. Entry to the subroutine could also be through GOTO or IF...THEN. The subroutine is entered directly if 7000 is the next line to be executed. Accidental direct entry into the subroutine is avoided by the END statement at line 6999. For entry from the keyboard use GOTO 7000 or RUN 7000 commands.

Adding a Screen Print to Any Program

1. Load this program, enter [CLEAR/HOME], list the program to the screen and edit line numbers to fit in your program.
2. Load your program. Then since the GET-PRINT subroutine is on the screen, you can enter it into your program by moving the cursor to each line in turn and pressing RETURN.
3. Add a control line in your program for the screen that you want printed, such as:

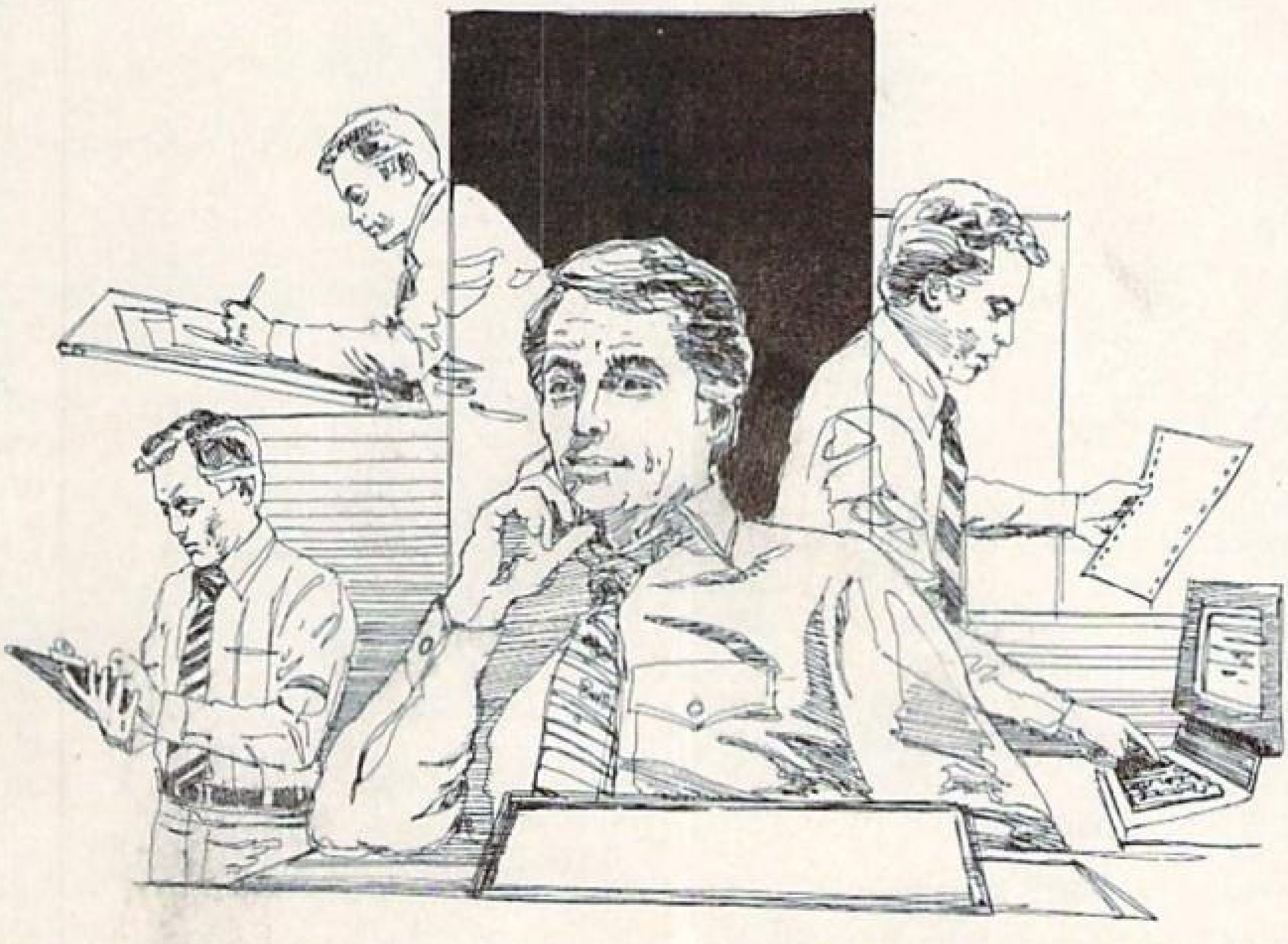
```
200 INPUT "DO YOU WANT A PRINT";A$: IF A$ =
          "Y" THEN GO SUB 7000
```

C

GET-PRINT

```
7000 OPEN 1,3:OPEN 2,4:PRINT#1,
     CHR$(19);'EPIE
7010 FOR M=1 TO 25:A$="[SPACE15]"'EHLF
7020 FOR L=1 TO 40:GET#1,B$:A$=A$+B$
     :NEXT'HSAI
7030 R$=CHR$(13):IF B$=R$THEN
     7050'FPFI
7040 PRINT#2,A$:NEXT M:GOTO 7060'DLSG
7050 PRINT#2,A$;:NEXT M'CHIG
7060 PRINT#1:CLOSE 1:PRINT#2
     :CLOSE 2'EHCI
7070 END'BACG
```

END



BY JIM LOCKRIDGE

Language Translator

for the Commodore 64

This program returns the English equivalent of foreign words the user inputs or vice-versa.

Here's a program I've written to help me with my high school German homework. With the unexciting name of Language Translator and simple BASIC programming, it seems modest enough and is. Its simplicity is its beauty! It will return the English equivalent of foreign words the user inputs or vice-versa. Of course you must provide the computer with a list of words and translation.

How It Works

Line 10 clears the screen. Lines 40 through 90 ask you if the word to be translated will be English or foreign. If you wish to translate from English to foreign, just type a one and press RETURN. For a foreign-to-English translation, type two then RETURN.

Line 100 asks for the word you wish to translate. Type the word, then press RETURN.

The last segment of the program checks the list of words you've entered as data statements for a match with the word you've entered for translation. If it finds the match, it will read the corresponding translation and print it. Voila! If no match is found, it will give you the message "Not in File."

After an appropriate time delay, the program will run itself again and you'll be ready to start all over.

Hints for Use

A few helpful hints are in order. First, it would be impractical to enter an entire dictionary of a foreign language as data (from line 5000 to line 59,999). The index at the rear of a student textbook should suffice.

Second, if you should enter a word for translation and find it "Not in File," it would be a good idea to add it to your data. Don't forget, first comes the English word, then the foreign word (within the data statement). The program must be re-saved each time words are added to the list.

Finally, the program could even be used as a code scrambler/de-scrambler. Make up your own versions of English words and use this program to create cryptic notes. It will provide translation from English to code.

Language Translator

```
10 PRINT CHR$(147);CHR$(144)
   :POKE 53280,14:POKE 53281,6'FDKF
40 PRINT"LANGUAGE[RIGHT]
   TRANSLATOR BY JIM LOCKRIDGE"'BAVK
50 PRINT"CHOOSE ONE:"'BAJE
60 PRINT"ENGLISH TO FOREIGN [RVS]1
   [RVOFF]"'BAAI
70 PRINT"[DOWN]FOREIGN TO ENGLISH
   [RVS]2[RVOFF]"'BASJ
80 INPUT A'BBWE
90 IF A<>1 AND A<>2 THEN PRINT"1 OR 2
   PLEASE":FOR TT=1 TO 4000:NEXT
   :RUN'NOYT
100 INPUT"WORD FOR TRANSLATION";
    W$'BDEB
120 IF A=2 THEN 300'DFIY
140 READ AA$:READ BB$'CHYB
150 IF AA$=W$THEN PRINT CHR$(5);BB$
    :RESTORE:FOR TT=1 TO 6000:NEXT
    :RUN'LXUL
160 IF AA$="TTTTT"THEN PRINT W$;
    " NOT IN FILE":FOR TT=1 TO 4000
    :NEXT:RUN'JQRO
170 GOTO 140'BDED
300 READ AA$:READ BB$'CHYY
310 IF BB$=W$THEN PRINT CHR$(5);AA$
    :RESTORE:FOR TT=1 TO 6000:NEXT
    :RUN'LXUJ
320 IF AA$="TTTTT"THEN PRINT W$;
    " NOT IN FILE":FOR TT=1 TO 4000
    :NEXT:RUN'JQRM
330 GOTO 300'BDCB
5000 DATA ENGLISH WORD,
     FOREIGN WORD'BXIE
60000 DATA TTTT,TTTT'BJDY
```

BY JERRY A. STURDIVANT

OPEN 4,4 for the Commodore 64 and PET

This little triple-loop program creates a one-page hex and decimal conversion chart that can be printed out on most Commodore-manufactured printers. Such a chart is handy, it's true. However, the program's main purpose is to show you how to write printer routines into your own programs using the OPEN 4,4, PRINT and CLOSE commands.

OPEN 4,4

```
1 OPEN 4,4:CMD 4:FOR I=0 TO 63
  :FOR J=I TO 255 STEP 64:D$=STR$(J)
  :PRINT J SPC(5-LEN(D$))
2 H=J/16:FOR K=1 TO 2:H%=H
  :H$=CHR$(48+H%-(H%>9)*7):PRINT H$;
  :H=16*(H-H%)
3 NEXT:PRINT SPC(12);:NEXT:PRINT:NEXT
  :PRINT#4:CLOSE 4
```

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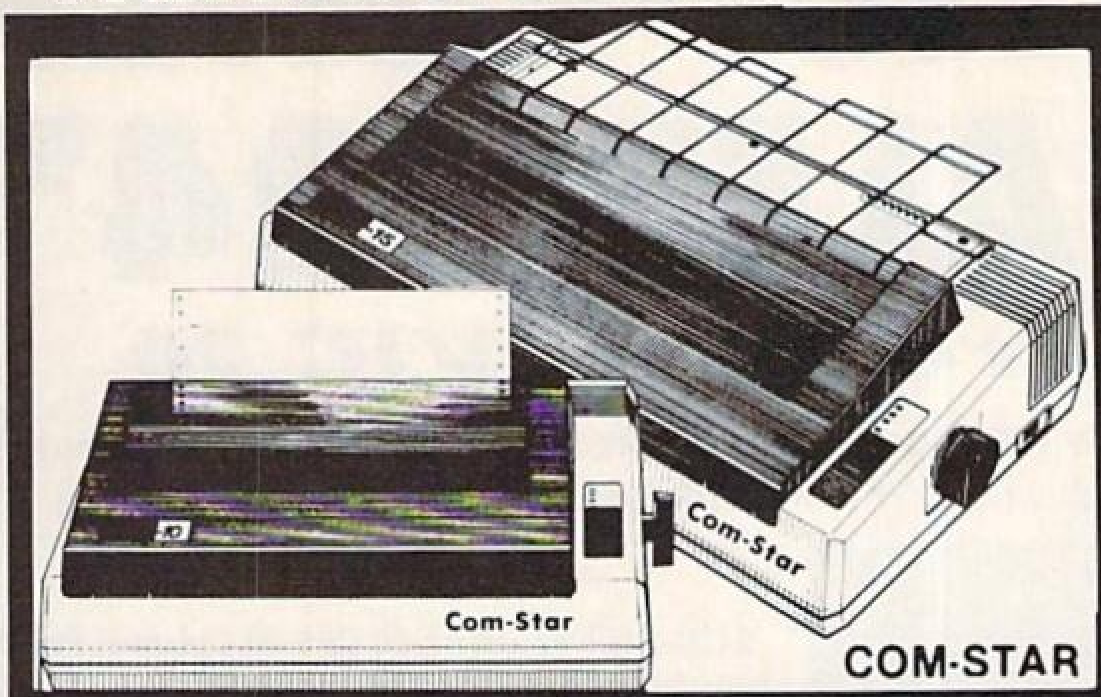

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Commodore 64 — VIC 20

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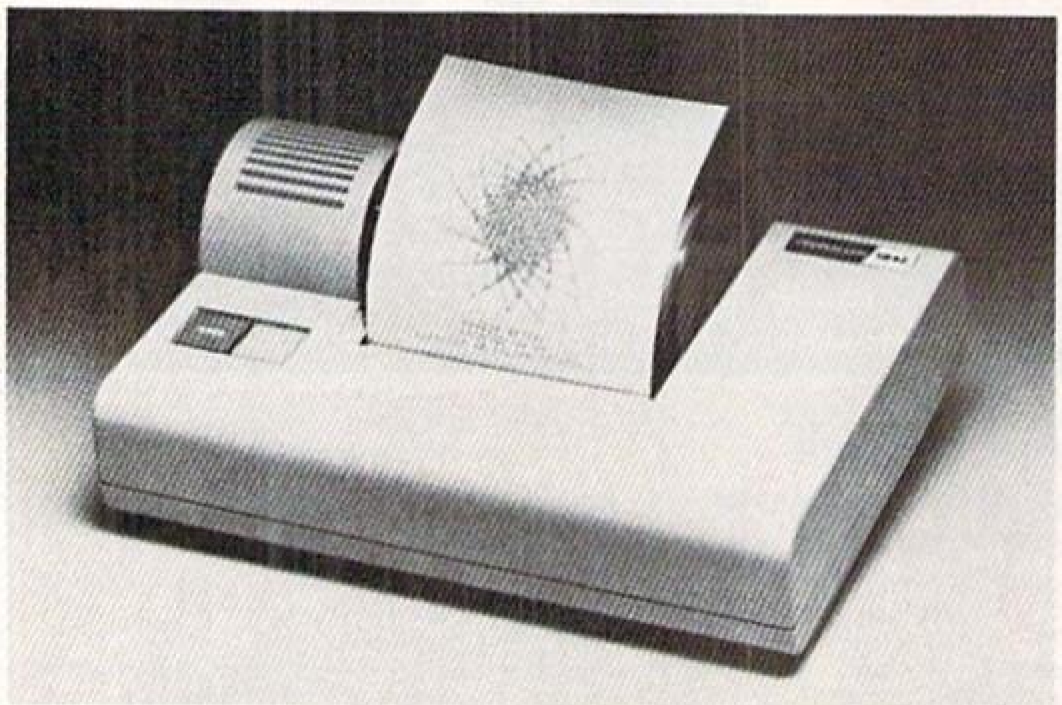

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Print out listings with full computer character sets (interface required, see below). Print in upper and lower case. Comes with a roll of paper and all power adapters needed. Perfect for a spare printer or program lister. List $99.00. **Sale $24.95.**

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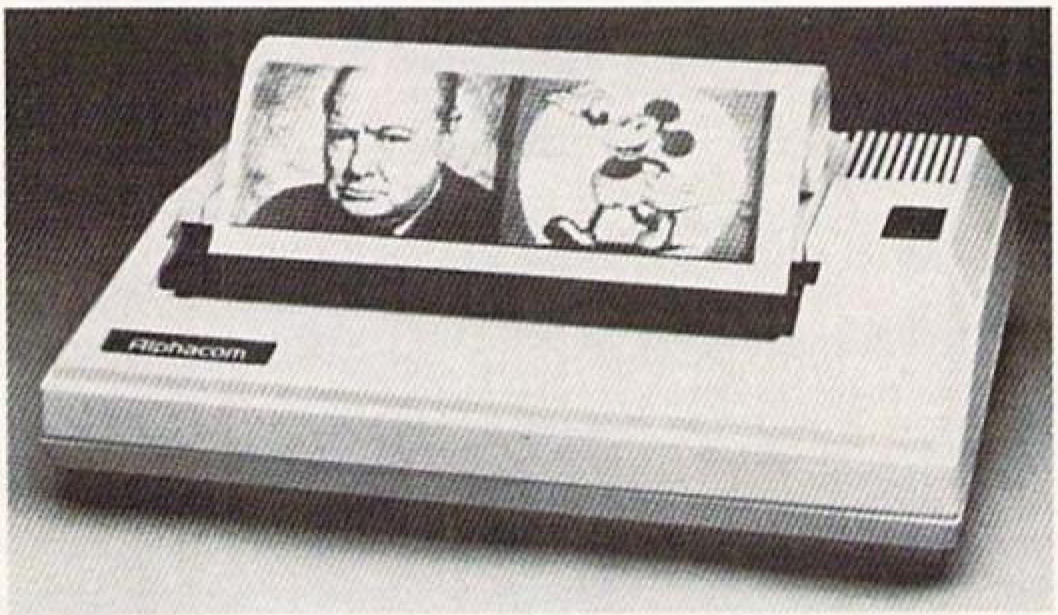
40 Column Sale $9.95. **80 Column Sale $14.95.**



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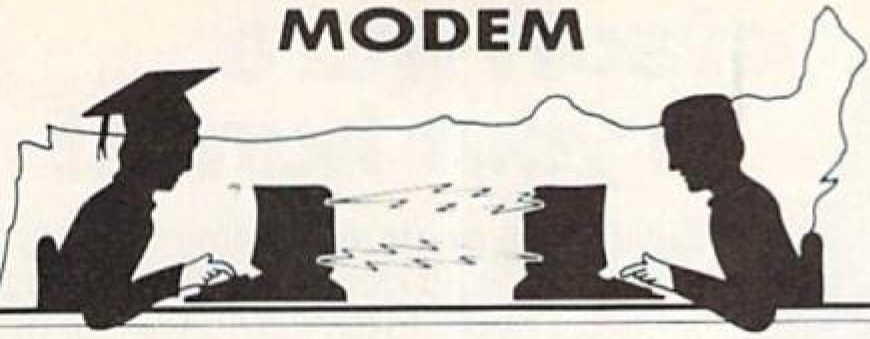
Commodore 64
MODEM

Sale



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Circle Reader Service No. 11

BY ALBERT WELLMAN

User-Friendly Disk Formatting for the Commodore 64 and 1541

Frustration-free disk formatting for novices.

I can still remember the day I brought home my 1541 disk drive. It is a splendid machine which has served me well, but the simplicity of the SAVE and LOAD command set me up for the subsequent frustration I experienced when first trying to use a blank disk.

Well, you and I know all about formatting now. But if you are blessed (as I am) with a spouse, children, parents and/or siblings who seem to solicit your assistance for this task whenever you try to eat, sleep or read this magazine—you can just hand them this program and get back to the activities that consume those hours away from the keyboard. You might even use the program yourself when you open a new box of disks.

If you have some programming experience, you may notice that statements 270, 390 and 400 are the ones that do the bulk of the work here. And it may seem rather inefficient to have them carry around the rest of the baggage in the name of "user friendly." Well, "user friendly" is *not* efficient in terms of memory. Its efficiency is measured in terms of the user's time—especially the first-time user. Let's see how the extra baggage pays its freight.

Statements 40 through 90 provide an opening screen, which tells the user what the program will do and warns of a potential danger of using the program. This presentation will be of little interest once a user becomes familiar with the program, but it is vitally important to the new user and it will always serve to identify the program and refresh the user's memory if the program is seldom used.

Statement 100 reminds the user to remove the working disk from the machine, and statements 110 through 140 prevent further progress on the program until the user has taken this precaution.

Statements 150 through 180 tell the user exactly what input is required and how that input is to be entered. Although the entry format corresponds to an INPUT command, the GET command is actually used because it offers greater flexibility with fewer keystrokes. There are three likely errors which the program checks for in this entry—the user of a comma, the user of a quotation mark or a name of excessive length.

Statement 181 initializes the name variable to prevent carryover of information from a previous error.

Statement 182 gets a single character from the keyboard. Let's skip 183 for a moment.

Statement 184 checks to see if the character is a quotation mark. If so, statement 205 advises the user of the error, repeats the entry instructions and restarts the entry procedure. Statement 186 makes the same check for a comma.

Statement 188 checks to see if the character is the RETURN key. This would indicate that the name is complete. Notice that any key could have been chosen for this purpose, but the RETURN key is commonly used in other formats and its use will tend to minimize user confusion.

If the character has passed all the tests, statement 190 prints the character on the screen just as it would have appeared had the INPUT format been used. The second portion of the statement adds the character to the name just as it would be added by the INPUT format. The final portion of this statement goes back to statement 182 for the next character.

Now let's consider the possibility that the character we just added to the name is not the character that the user intended to type. The user may very well be aware that the DELETE key can be used to correct such an error in the INPUT format. Since this entry format appears to follow INPUT procedures, we can assume that the user might press the DELETE key in this situation. Statement 183 checks to see if the character is the DELETE key. If the DELETE key has been pressed, the user is notified that the name entry procedure has been restarted.

Once the name has been entered, statement 192 checks to be sure that the permissable length has not been exceeded. If the length is too great, statement 200 informs the user of the problem and restarts the name entry procedure.

Statements 210 through 240 advise the user of the input that is required for the identification number. The potential errors here are the same as in the name and statements 242, 244, 252 and 254 are analogous to 184 and 186. The length-error potential is here also, but since the length is fixed rather than variable, it has been dealt with differently. This different treatment eliminates the need for a RETURN and saves an entry keystroke.

Statement 300 advises the user of the next task, and statements 310 through 330 remind the user once again of the potential danger of the process. Statement 360 requires an acknowledgement of that danger from the user, and statement 340 prevents an inadvertent override of that safety factor by the keyboard buffer. Subroutine 20 is from page 93 of the *Commodore 64 Programmer's Reference Guide*.

Now that we get to the point that the machine will be busy for awhile, it is only common courtesy to advise the user of that fact. Statement 380 includes the actual time delay that can be expected, which is a nice touch if the task is subject to precise definition, as in this case. Otherwise, user anxiety increases exponentially with the period of time that the machine continues to function without apparent output.

There really isn't anything here that wasn't in the 1541 user's manual or the Commodore 64 user's guide. The only difference is that the information is tucked away on page 15, and this information is right in front of the user when it is needed. Let's face it—the 1541 is a pretty attractive piece of hardware, and no one wants to learn how to drive by reading an operator's manual when there's a shiny new sports car in the driveway.

When it comes to "user friendly," these techniques are only suggestions. We all have a lot to learn on that subject. But I don't hear any complaints about a machine that's *too* user friendly. Many of us work with these machines so often that certain errors become almost unimaginable to us. But the folks who learned their jobs with slide rules and mechanical typewriters are going to need some help to get to that point.

Disk Format

```
10 POKE 646,1:POKE 53280,0
   :POKE 53281,0:PRINT"[CLEAR]"
   :S$="[SPACE10]":GOTO 40'GDKI
20 GET JUNK$:IF JUNK$<>""THEN 20'FNNE
30 RETURN'BAQY
40 PRINT"THIS PROGRAM WILL FORMAT A
   NEW DISK SO"'BAYK
50 PRINT"THAT FILES AND PROGRAMS MAY
   BE STORED"'BACL
60 PRINT"UPON IT.[SPACE2]
   IF THIS PROCESS IS PERFORMED"'BACM
70 PRINT"UPON A DISK WHICH IS ALREADY
   USED FOR"'BAJN
80 PRINT"SUCH STORAGE, ALL
   INFORMATION ON THAT"'BAKO
90 PRINT"DISK WILL BE ERASED."'BANK
100 PRINT"[DOWN2,RVS]REMOVE THE
    PRESENT DISK FROM THE DRIVE!"'BANG
110 GOSUB 20'BCNV
120 PRINT"[DOWN2]IS THE DISK DRIVE
    EMPTY?[SPACE2](Y/N)"'BAUF
130 GET A$:IF A$=""GOTO 130'EIEB
140 PRINT"[CLEAR]":IF A$<>"Y"GOTO 100'FGVE
150 PRINT"THE NEW DISK SHOULD HAVE A
    NAME OF LESS"'BAGK
160 PRINT"THAN 17 CHARACTERS WHICH
    CANNOT INCLUDE"'BAIM
170 PRINT"COMMAS AND QUOTATION
    MARKS."'BAUK
180 PRINT"[DOWN2]TYPE THE NAME OF THE
    DISK AND THEN PRESSTHE [RVS]
    RETURN[RVOFF] KEY[DOWN2]";'BBUT
181 B$=""'BCYF
182 GET A$:IF A$=""GOTO 182'EIGJ
183 IF ASC(A$)=20 THEN PRINT"[CLEAR,
    RVS]"S$"[SPACE6]RESTART"S$"
    [SPACE7,DOWN2]":GOTO 150'GODR
184 IF ASC(A$)=34 GOTO 205'EJNL
186 IF ASC(A$)=44 GOTO 205'EJON
188 IF ASC(A$)=13 GOTO 192'EJPP
190 PRINT A$;:B$=B$+A$:GOTO 182'EOSJ
192 IF LEN(B$)<17 GOTO 210'EJJK
200 PRINT"[CLEAR]";B$:PRINT" IS TOO
    LONG FOR A DISK NAME.[DOWN]"
    :GOTO 150'DIVH
205 PRINT"[CLEAR,RVS,SPACE2]
    ILLEGAL CHARACTER FOLLOWING ";B$;
    "[DOWN2]":GOTO 150'CIJM
209 PRINT"[CLEAR,DOWN,RVS,SPACE11]
    ILLEGAL[SPACE2]CHARACTER[SPACE11]
    "'BAFN
210 PRINT:PRINT"[DOWN2]
    THE NEW DISC NEEDS AN
    IDENTIFICATION"'CBQI
220 PRINT"NUMBER OF TWO CHARACTERS
    WHICH CANNOT"'BAXI
230 PRINT"INCLUDE COMMAS AND
    QUOTATION MARKS."'BAMJ
240 C$="":PRINT"[DOWN2]
    TYPE THE IDENTIFICATION
    NUMBER"'CDBK
242 GET A$:IF A$=""GOTO 242'EIDG
244 IF ASC(A$)=34 GOTO 209'EJRI
246 IF ASC(A$)=44 GOTO 209'EJSK
248 C$=A$:PRINT C$;'CIRK
250 GET A$:IF A$=""GOTO 250'EICF
252 IF ASC(A$)=34 GOTO 209'EJRH
254 IF ASC(A$)=44 GOTO 209'EJSJ
256 PRINT A$'BCDH
260 C$=C$+A$'CGRE
270 D$="N8:"+B$+","+C$'EGMH
300 PRINT"[CLEAR,RVS,SPACE4]
    PLACE THE NEW DISK IN THE DRIVE
    [SPACE5,RVOFF]"'BAYI
310 PRINT"[DOWN2]ALL INFORMATION
    PRESENTLY ON THE DISK"'BAJJ
320 PRINT"WHICH IS NOW IN THE DRIVE
    WILL BE"'BAUI
330 PRINT"ERASED IF YOU PRESS [RVS]Y
    [RVOFF]."'BAKH
340 GOSUB 20'BCNB
350 PRINT"[DOWN2]IS THE NEW DISK IN
    THE DRIVE?[SPACE2](Y/N)"'BARL
360 GET A$:IF A$=""GOTO 360'EIEH
370 IF A$<>"Y"GOTO 300'EFBH
380 PRINT"[CLEAR,DOWN11,RVS]
     WAIT 80 SECONDS....FORMATTING
    THE DISK "'BAUR
390 OPEN 15,8,15,D$'BKRI
400 CLOSE 15'BCGY
410 PRINT"[CLEAR]THIS DISK IS READY
    FOR STORAGE."'BAHI
420 GOSUB 20'BCNA
430 PRINT"[DOWN3,RVS,SPACE18]MENU
    [SPACE18]"'BAAH
440 PRINT"[DOWN2,RVS]1[RVOFF,SPACE2]
    FORMAT ANOTHER DISK WITH SAME
    NAME[SPACE6]AND ID NUMBER"'BAYR
450 PRINT"[DOWN,RVS]2[RVOFF,SPACE2]
    FORMAT ANOTHER DISK WITH SAME
    NAME"'BAHO
455 PRINT"BUT DIFFERENT ID
    NUMBER"'BADO
460 PRINT"[DOWN,RVS]3[RVOFF,SPACE2]
    FORMAT ANOTHER DISK WITH
    DIFFERENT"'BAGP
465 PRINT"NAME AND ID NUMBER"'BAGO
470 PRINT"[DOWN,RVS]4[RVOFF,SPACE2]
    QUIT THE PROGRAM"'BACL
480 GET A$:IF A$=""GOTO 480'EIHK
490 PRINT"[CLEAR]":ON VAL(A$)GOTO 300,
    210,100'EQLN
500 END'BACY
```

END

BY JOHN STILWELL

Peabody

A File Handler for Expanded VIC 20 and Commodore 64

Let me introduce you to Mr. Peabody, your new personal file clerk. Peabody is a versatile file-handling program for both the Commodore 64 and the VIC 20 with an 8K or larger memory expansion. You have the capability to design the shape of each file. Peabody can be used to manage things like book lists, addresses, inventories and mailing lists. For storage, this program uses both the 1541 single disk drive and the Commodore datassette.

When the program is run, the cover page will be displayed for a moment. Then you'll be asked if you would like an old file. Pressing any key other than Y tells the computer that you would rather start one from scratch.

When you start a new file, the first thing that the computer asks you for is how many fields you want each entry to have. For example, if you wanted to create a mailing list you might need five fields, so you would press the number five. You can have a maximum of seven.

Next, you want to give a name to each of the five fields. The first one we will call "first name." We'll call the second one "last name," the third "street," the fourth "city state zip" and the fifth we'll call "phone."

Lastly, you will be asked to give the entire file a name. Let's call it "mail list." At this point, we will automatically go to the menu.

The top row of the menu shows the file name, the maximum number of entries the file can hold and the number of entries in the file. Below this is the word MENU. Next is the list of fields. The bottom half of the screen is the list of options. They are: load, save, enter, search, dump, printout, new and alphabetize.

To make an entry, press the F7 key. You'll be asked for each field individually. After all the fields are entered, a bar will appear at the bottom of the screen that says "edit." If you want to edit the entry, press E. The bar will change to "kill." Press K to erase the entry that you just made. Otherwise, press any other key and proceed to edit. Whenever you see the "edit" bar and you don't want to edit, press any key other than E.

Press F1 to search for an individual entry or a group of entries. You will be asked which field to search by. In our "mailing list" file, if you want to find the phone number of someone named Brown, press the number two—the "last name" field. You will be asked for the last name. Type in "Brown" and press RETURN. All the information on Brown will be displayed. There will be an edit bar below the entry, which is operated in the same way as before. If you press any key other than E, the computer will look for more Browns. When the computer has looked through the entire file, it will say "scan complete." Press any key to go back to the menu.

The dump command lets you see the entire file. Press D and the first entry will be displayed with an edit bar. The best way to scan through the file is to hold down the space bar.

When you want to organize a file alphabetically, press A. You will be given a list of the fields. Any field can be chosen as the one to sort by. Press the number of the field—for instance, number two for the last name—and press RETURN. The numeral 2 appears at the top of the screen. If you have more than one person with the same last name and you want the computer to take the first name into account, press number one and RETURN. The numeral 1 will appear next to the 2. When you have entered all the relevant fields and you have not used all of the fields, press RETURN an extra time. The screen border will flash as it sorts, slowly at first, but gaining speed as it nears completion.

When you want to save your file, press S. You will be asked to confirm your intentions. We wouldn't want to save a file prematurely. You will next be asked if you are using tape. Any answer other than Y will tell the computer that you are using disk. When you save a file onto disk, it replaces the old one. Thus, we will always have only one file called "mailing list," saving us the trouble of having to remember which version is the most recent one.

When you want to load an old file, press L. You will be asked, first, to confirm and then whether you're using tape. If you're using disk, you'll be asked if you would like a directory listing of only the files that work in this program. Then you'll be asked for the name of the file to be loaded in. If you change your mind about loading a file, press RETURN without giving it a name.

If you are using tape, you will be asked only for the file name. If you press RETURN without giving it a name, it will load in the first file that it finds.

To get a printout of part or all of your file, press D. You will be asked whether you are using labels or paper. To print labels, press L. You will be given a list of the fields. You have five lines on the label. If you don't want anything on a line, tell the computer to use field zero for that line. In our example, we want only three lines on the label so we don't want anything on the first or last line. In this case, press zero for line one, then press RETURN. This tells the computer to put nothing on this line. On line two we want the person's name. Since we have their first and last name in different fields. We need some way to tack them together. To do this, type "1+2" and press RETURN. You can tack up to two fields together per line. For line three, enter "3." For line four, enter "4" and enter "0" on line five.

When something has been entered for all five lines, you will then be asked if the label looks okay. If it does, you will go to the last set of choices. If you were using paper instead of labels, you would have gone directly to this last set of choices: dump, search or return to the menu.

Use Peabody to manage book lists, addresses, inventories and mailing lists.

When you are using paper, the file name is centered and printed using double-width letters. The entries are printed in columns, the width of which depends on how many fields are in the file. For example, if you are using seven fields, you have ten characters to a column. Since most entries are probably more than ten characters, entries are broken up into segments, one printed under another. The segments are left-justified in their respective columns—and have no fear, Peabody is good about not cutting words in half.

"New" allows you to erase a file while preserving the field names and file size or to start a new file from scratch. You can also change the file name while preserving what's in the file.

I would like to give you some tips. When you are searching and you don't know how to spell the word that you're searching for, type in the first couple of letters ending with an asterisk. The asterisk is a wild card. This tells the computer to search for all of the words that start with the same letters that you typed in. This is very handy if you've set up a dictionary or a language translation file.

To get Peabody to add up columns, "#" has to be the first character in the field's name. For example, you collect power tubes and on occasion want to know how many tubes you have. You have decided that you are going to have two fields. The first is the part number and the second is the quantity. To get a total of the second field after a scan or dump, the first character in the field's name has to be a number sign. Thus, we'll call the field "#quantity" when we set up the file.

The numbers in entries can have up to two non-numeric characters in front of them. For example, "$100 received" is okay. To get a negative, "$-100" is okay. However, "received $100" won't work. The program will consider the number of this entry to be zero.

Peabody

```
2 POKE 53280,1'BHUB
4 POKE 53281,1:PRINT"[BLACK]"
  :FOR I=1 TO 5:L$(I)="0":NEXT I'HUUL
6 PRINT"[CLEAR,DOWN]"TAB(15)"[RVS,
  SPACE9]"'CDLH
8 PRINT TAB(15)"[RVS] PEABODY "
  :PRINT TAB(15)"[RVS,SPACE9]"'EHTN
12 PRINT TAB(11)"[DOWN2]
   BY JOHN STILWELL"'CDMF
14 FOR I=0 TO 5000'DGVE
16 NEXT'BAED
18 PRINT"[CLEAR,DOWN4]WOULD YOU LIKE
   AN OLD FILE?[DOWN3]"'BALN
20 GOSUB 162:IF A$="Y"THEN 204'EJCC
22 R$="[SHFT *]"'BCHB
24 PRINT"[CLEAR,RVS] HOW MANY
   FIELDS(1-7)?":GOSUB 162:C=VAL(A$)
   :IF C<1 OR C>7 THEN 22'JRPR
26 GOSUB 304'BDKF
28 PRINT"[DOWN]PLEASE WAIT"'BATJ
30 FOR I=0 TO C:T$(I)="[SHFT *]"
   :NEXT I:Y=-1'HOTH
32 FOR J=0 TO C'DDWD
34 PRINT"[CLEAR,RVS]FIELD NAMES?"
   :GOSUB 158'CEEI
36 PRINT"[RVS]WHAT IS "J+1"[LEFT]
   'S NAME"'CCSL
38 INPUT T$(J):NEXT J'CHHJ
40 PRINT"[DOWN,RVS]THE NEW FILE
   NAME"'BADF
42 INPUT R$'BCAC
44 CLOSE 4'BBLE
46 G=0:PRINT"[CLEAR]"R$":"E+1":"Y+1
   :PRINT TAB(15)"[DOWN,CMDR +]MENU
   [CMDR +,DOWN]":GOSUB 158'HRBR
48 PRINT"[DOWN,RVS]F1[RVOFF]-SEARCH
   [SPACE7,RVS]D[RVOFF]-DUMP"'BACO
50 PRINT"[DOWN,RVS]F7[RVOFF]-ENTRY
   [SPACE8,RVS]H[RVOFF]
   -HARD COPY"'BAXJ
52 PRINT"[DOWN,RVS]N[RVOFF]
   -NEW FILE"'BACG
54 PRINT"[DOWN,RVS]A[RVOFF]
   -ALPHABETIZE"'BARJ
56 PRINT"[DOWN,RVS]L[RVOFF]
   -LOAD FROM TAPE/DISC"'BAJN
58 PRINT"[DOWN,RVS]S[RVOFF]
   -SAVE TO TAPE/DISC[HOME]"'BADP
60 GOSUB 162'BDMD
62 IF A$="[F7]"THEN 80'DEHH
64 IF A$="D"THEN 276'DFTJ
66 IF A$="[F1]"THEN 100'DFUL
68 IF A$="S"THEN 186'DFJN
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70 IF A$="L"THEN 198'DFFG
72 IF A$="A"THEN 368'DFSI
74 IF A$="N"THEN 140'DFTK
76 IF A$="H"THEN 440'DFQM
78 GOTO 60'BCNL
80 PRINT"[CLEAR,RVS] MAKE AN ENTRY
   [DOWN]"'BAAJ
82 IF Y=E THEN PRINT"[DOWN]FILE FULL"
   :FOR I=1 TO 1000:NEXT I
   :GOTO 44'JOJR
84 K=0'BCTJ
86 FOR I=0 TO Y:IF C$(0,I)="[SHFT *]
   "THEN L=I:I=Y:K=1'JTIV
88 NEXT'BAEM
90 Y=Y+1:IF K=0 THEN L=Y'GIVL
92 P%(Y)=L'BGDJ
94 L=Y'BCLK
96 FOR I=0 TO C'DDVN
98 PRINT T$(I):C$(I,P%(Y))="[SHFT *]"
   :INPUT C$(I,P%(Y)):NEXT:GOSUB 168
   :GOTO 44'GMBY
100 PRINT"[CLEAR] [RVS] SEARCH"'BAIX
102 GOSUB 310:GOSUB 618
    :IF Q<1 OR Q>C+1 THEN 44'IPUF
104 Q=Q-1'CDWB
106 PRINT"[DOWN]WHAT IS THE "T$(Q)
    :INPUT Q$:KK=0:IF RIGHT$(Q$,
    1)="*"THEN KK=1'IWNO
108 IF G=1 THEN GOSUB 464'EFJG
110 K=0'BCTW
112 PRINT"[CLEAR] [RVS]SEARCHING
    [DOWN]":IF KK=0 THEN FOR L=0 TO Y
    :IF C$(Q,P%(L))=Q$THEN 118'KYXN
114 IF KK=1 THEN FOR L=0 TO Y
    :IF LEFT$(C$(Q,P%(L)),
    LEN(Q$)-1)+"*"=Q$THEN 118'NGXP
116 GOTO 132'BDFD
118 GOSUB 622'BDNF
120 K=1'BCUX
122 FOR J=0 TO C'DDWB
124 PRINT C$(J,P%(L))",";:NEXT J
    :PRINT CHR$(20):IF G=0 THEN GOSUB
    168:GOTO 132'JEXM
126 IF G=1 THEN GOSUB 488:PRINT
    :GOTO 132'GKJI
128 GOSUB 548'BDUG
130 PRINT'BACX
132 NEXT L'BBFA
134 IF K=0 THEN PRINT"[RVS]
    NO RECORD OF THE "T$(Q)","Q$'EJLL
136 GOSUB 606'BDPF
138 PRINT"[DOWN,RVS]SCAN OVER"
    :GOSUB 162:GOTO 44'DHHL
140 PRINT"[CLEAR] [RVS]NEW FILE"'BASC
142 GOSUB 264:IF A$<>"Y"THEN 44'FIGG
144 GOSUB 158'BDRE
146 PRINT"[DOWN]THE SAME FILE SET UP"
    :GOSUB 162:IF A$="Y"THEN Y=-1
    :GOTO 44'IMOS
148 PRINT"[UP]DIFFERENT FILE SET
    UP?"'BALO
150 GOSUB 162:IF A$="Y"THEN CLR:Y=-1
    :GOTO 22'IMFH
152 PRINT"[UP]HOW ABOUT A NEW
    TITLE?"'BASJ
154 GOSUB 162:IF A$="Y"THEN GOTO
    40'FIOI
156 GOTO 44'BCPG
158 FOR I=0 TO C'DDVK
160 PRINT"[LEFT]"I+1;T$(I):NEXT I
    :RETURN'ELQG
162 GET A$'BCGE
164 IF A$=""THEN 162'DFAH
166 RETURN'BAQH
168 PRINT"[DOWN,RVS]PUSH E TO EDIT
    THIS"'BAIO
170 GOSUB 162'BDMD
172 IF A$<>"E"THEN PRINT"[UP,SPACE20,
    UP]":RETURN'GDTM
174 PRINT"[RVS,UP]PUSH K TO KILL
    ENTRY[DOWN]"'BABM
176 GOSUB 162:IF A$="K"THEN GOSUB 364
    :RETURN'GKFN
178 FOR I=0 TO C'DDVM
180 PRINT"[RVS]"T$(I):PRINT"[DOWN,
    SPACE2]"C$(I,P%(L));
    :LN=LEN(C$(I,P%(L)))
    :FOR M=0 TO LN'HOQQ
182 PRINT"[LEFT]";'BBNG
184 NEXT M:PRINT"[UP]":INPUT C$(I,
    P%(L)):NEXT I:PRINT:RETURN'GSJO
186 PRINT"[CLEAR,RVS,SPACE2]
    SAVE TO TAPE/DISK[SPACE3]"'BAGP
188 GOSUB 264:IF A$<>"Y"THEN 44'FIGQ
190 GOSUB 272'BDOF
192 IF A$<>"Y"THEN 212'EFIJ
194 GOSUB 268'BDTJ
196 Z=1:OPEN 1,1,1,R$:GOSUB 216
    :GOTO 44'ESUQ
198 IF E<1 THEN 18'DEUO
200 PRINT"[CLEAR,RVS] LOAD FROM
    TAPE/DISK[SPACE2]"'BAYC
202 GOSUB 264:IF A$<>"Y"THEN 44'FIGD
204 CLR'BAFA
206 Y=-1:GOSUB 272:IF A$<>"Y"THEN
    226'HMNJ
208 GOSUB 268'BDTF
210 Z=1:OPEN 1,1,0:GOSUB 240
    :GOTO 44'EPKC
212 GOSUB 254'BDOA
214 Z=2:OPEN 2,8,2,"@0:"+R$+" [SHFT Q]
    ,S,W":GOSUB 216:GOTO 44'GSXL
216 PRINT#Z,R$+" [SHFT Q]"'CEWG
218 PRINT#Z,C'BDVG
220 PRINT#Z,Y:FOR I=0 TO C
    :PRINT#Z,T$(I):NEXT I
    :FOR I=0 TO Y'JVYI
222 FOR J=0 TO C'DDWC
224 PRINT#Z,C$(J,P%(I)):NEXT J,I
    :CLOSE Z:RETURN'EUJI
226 GOSUB 314'BDLF
228 GOSUB 254:CLR:Y=-1:Z=2
    :PRINT"[DOWN]FILE NAME":INPUT A$
    :IF A$=""THEN 198'KUTT
230 OPEN 2,8,2,"0:"+A$+" [SHFT Q],S,
    R"'DIOE
```

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232 INPUT#Z,R$'BECC
234 IF R$<>""THEN R$=LEFT$(R$,
    LEN(R$)-2):GOSUB 244:GOTO 44'KVAN
236 CLOSE Z'BBYF
238 GOSUB 254:PRINT"[DOWN,RVS]
    "A$" NOT FOUND":PRINT"[DOWN]
    PUSH ANY KEY":GOSUB 162
    :GOTO 198'FPJT
240 INPUT#Z,R$'BECB
242 R$=LEFT$(R$,LEN(R$)-2)'EMXH
244 PRINT"[DOWN,RVS]FOUND "R$'BCKG
246 INPUT#Z,C'BDBH
248 INPUT#Z,Y:C=C+1:GOSUB 258
    :FOR I=0 TO C:INPUT#Z,T$(I)
    :NEXT I'JALT
250 FOR I=0 TO Y'DDSD
252 P%(I)=I:FOR J=0 TO C
    :INPUT#Z,C$(J,P%(I)):NEXT J,I
    :CLOSE Z:RETURN'IGHO
254 OPEN 15,8,15,"UI+"'BIRH
256 CLOSE 15:RETURN'CDFI
258 GOSUB 304'BDKK
260 IF K>E THEN K=E:PRINT"WARNING
    FILE FROM COMPUTER WITH MORE
    MEMORY":RETURN'GGKT
262 RETURN'BAQE
264 PRINT"[DOWN]ARE YOU SURE?"'BAVK
266 GOSUB 162:RETURN'CEMJ
268 PRINT"[UP,SPACE2,RVS]
    * TAPE CONFIRMED *"'BABQ
270 RETURN'BAQD
272 PRINT"[UP,RVS]ARE YOU USING
    TAPE?"'BAML
274 GOSUB 162:RETURN'CEMI
276 PRINT"[CLEAR,SPACE3,RVS]
     DUMP "'BAYM
278 GOSUB 618:IF G=1 THEN GOSUB
    464'FJLP
280 PRINT'BACE
282 Q=0:K=0:L=0'DICK
284 IF L>Y THEN 300'DFBL
286 FOR J=0 TO C'DDWM
288 PRINT C$(J,P%(L))",";:NEXT J
    :PRINT CHR$(20):GOSUB 622'FXTT
289 IF G=0 THEN GOSUB 168
    :GOTO 296'FJJR
290 IF G=1 THEN GOSUB 488:PRINT
    :GOTO 296'GKUK
292 GOSUB 548'BDUI
294 PRINT'BACJ
296 L=L+1'CDLN
298 GOTO 284'BDNO
300 GOSUB 606'BDPX
302 PRINT"[RVS]DUMP COMPLETE"
    :GOSUB 162:GOTO 44'DHPF
304 E=500'BEOC
306 C=C-1'CDUF
308 DIM C$(C,E),T$(C),P%(E)
    :RETURN'CUPK
310 GOSUB 158'BDRY
312 PRINT"WHICH FIELD":GOSUB 162
    :Q=VAL(A$):RETURN'FLVI
314 PRINT"[RVS,UP]DISC FILE LISTING?
    [DOWN]"'BAOI
316 GOSUB 162:IF A$<>"Y"THEN
    RETURN'GGQJ
318 PRINT"[CLEAR,RVS]SCANNING DISC
    [DOWN]"'BAOK
320 OPEN 1,8,0,"$0"'BGSB
322 GET#1,A$,B$'BIYD
324 GET#1,A$,B$'BIYF
326 GET#1,A$,B$'BIYH
328 C=0'BCLI
330 IF A$<>""THEN C=ASC(A$)'GHHF
332 IF B$<>""THEN C=C+ASC(B$)*256'ILNJ
334 D$=D$+"[RVS]"+MID$(STR$(C),2)+"
    [RVOFF]"'GLUK
336 GET#1,B$'BFJH
338 IF ST<>0 THEN CLOSE 1:PRINT
    :RETURN'HGQN
340 IF B$<>CHR$(34)THEN 336'FJXG
342 GET#1,B$'BFJE
344 IF B$<>CHR$(34)THEN D$=D$+B$
    :GOTO 342'IQEN
346 GET#1,B$'BFJI
348 IF B$=CHR$(32)THEN 346'EJYN
350 C$=""'BCYD
352 C$=C$+B$'CGSG
354 GET#1,B$:IF B$<>""THEN 352'FLLL
356 D$=D$+" "+"[RVS]"+LEFT$(C$,3)'FKTN
358 IF RIGHT$(D$,6)="[SHFT Q] "+"[RVS]
    "+"SEQ"THEN PRINT D$"[RVOFF,LEFT5,
    SPACE5]"'HIKW
360 D$=""'BCAE
362 GOTO 324'BDIG
364 Y=Y-1'CDNJ
366 FOR I=0 TO C:C$(I,P%(L))="[SHFT *]
    ":NEXT I:FOR I=L TO Y
    :P%(I)=P%(I+1):NEXT I'LKIY
367 L=L-1:RETURN'DEMM
368 PRINT"[CLEAR,RVS]ALPHABETIZE[DOWN]
    "'BAGP
370 FOR I=0 TO C:I%(I)=0:NEXT
    :GOSUB 158'GPPK
372 PRINT"[DOWN]PUSH RETURN IF YOU
    [SPACE4]DON'T WANT ANYMORE"'BATR
374 FOR I=0 TO C:K=0'EGYL
376 A$=""'BCXL
378 PRINT"[HOME,DOWN16]
    ENTER THE#"I+1"IMPORTANTFIELD"'CC
    LV
380 INPUT"[SPACE9,LEFT9]";A$'BDKM
382 I%(I)=VAL(A$)'CJCK
384 L=I'BCUK
386 IF A$=""THEN I=C:GOTO 400'FIVP
388 IF I%(I)<1 OR I%(I)>C+1 THEN
    PRINT"[UP4]":GOTO 376'IRHX
390 I%(I)=I%(I)-1'CLHJ
392 K=0:FOR J=0 TO I:IF
    I%(J)=I%(I)THEN K=K+1'JUHS
394 NEXT J'BBDK
396 IF K=2 THEN PRINT"[UP4]":K=0
    :GOTO 376'GJMU
398 PRINT"[HOME,DOWN]"TAB(I*3)"
    :"I%(I)+1'EJGS
400 NEXT I'BBCX
```

```
402 IF L=0 THEN 44'DEYC
404 FOR K=L TO 0 STEP-1'FEJG
406 I=0'BCRF
408 KL=0'BDUH
410 J=0:IF I=Y THEN 436'EILD
412 IF J=Y-I THEN 430'EGSF
414 IF C$(I%(K),P%(J))=C$(I%(K),
    P%(J+1))THEN 426'EJLM
416 IF C$(I%(K),P%(J))<C$(I%(K),
    P%(J+1))THEN GOTO 422'FJUO
418 U=P%(J)'BGXJ
420 P%(J)=P%(J+1):P%(J+1)=U:KL=1'FXPI
422 J=J+1'CDHE
424 GOTO 412'BDGF
426 J=J+1'CDHI
428 GOTO 412'BDGJ
430 IF KL=0 THEN 436'DGVE
432 I=I+1'CDFF
434 POKE 53280,INT(RND(Y)*8+1)
    :GOTO 408'GRCM
436 NEXT K'BBEH
438 GOTO 44'BCPJ
440 PRINT"[CLEAR]USING [RVS]P[RVOFF]
    APER OR [RVS]L[RVOFF]ABELS?"'BAWK
442 GOSUB 162:IF A$="L"THEN G=2
    :GOSUB 572:GOTO 448'HQHL
444 G=1'BCQH
446 PRINT"USING PAPER"'BARL
448 PRINT"[CLEAR,RVS]MAKE A HARD COPY
    [DOWN2]"'BAJP
450 PRINT"D[SPACE2]- DUMP"
    :PRINT"[DOWN,RVS]F1[RVOFF]
     - SEARCH"'CBJJ
452 PRINT"[DOWN3]R - RETURN TO THE
    MENU"'BAXL
454 GOSUB 162'BDMI
456 IF A$="R"THEN G=0:GOTO 44'FHON
458 IF A$="D"THEN GOTO 276'EFGO
460 IF A$="[F1]"THEN 100'DFUH
462 GOTO 454'BDMH
464 OPEN 4,4'BDAJ
466 A$="":FOR I=1 TO INT((40-LEN(R$))
    /2):A$=A$+" ":NEXT I'LXUV
467 PRINT#4,CHR$(14)A$+R$'DKYO
468 PRINT#4,CHR$(15)CHR$(10)'DKNP
470 K=0:NL=7:FOR I=0 TO 6:M%(I)=0
    :NEXT I'HTON
472 A$=""'BCXI
474 KL=0:FOR N=0 TO C:II=-5:BB$=T$(N)
    :GOSUB 510'IYBT
476 NEXT N'BBHL
478 PRINT#4,A$:NL=NL+1:IF KL THEN
    K=K+16-C:GOTO 472'JWCY
480 X=LEN(A$)'CFFI
482 A$="":FOR I=1 TO X:A$=A$+"[CMDR U]
    ":NEXT I'HNYQ
483 PRINT#4,CHR$(15)A$CHR$(18)CHR$(10)
    CHR$(15)'FUHQ
484 II=0'BDPL
486 RETURN'BAQM
488 IF C$(0,P%(L))="[SHFT *]
    "THEN RETURN'ELNT
490 FOR N=0 TO C'DDBJ
492 M%(N)=0:NEXT N'CICL
494 KL=0'BDUM
496 A$="":FOR N=0 TO C:BB$=C$(N,P%(L))
    :GOSUB 510'GAEW
498 NEXT N'BBHP
500 NL=NL+1'CFRB
501 IF NL>61 THEN FOR NN=NL TO 68
    :PRINT#4,CHR$(10);:NEXT NN
    :PRINT#4,"":NL=3'LDKN
502 PRINT#4,A$'BERC
504 IF KL THEN 494'CFFF
506 NL=NL+1'CFRH
508 PRINT#4:RETURN'CCWI
510 IF MID$(BB$,M%(N)+1,
    1)=" "THEN M%(N)=M%(N)+1
    :GOTO 510'IERL
512 J=15-C'CEEE
514 IF LEN(BB$)-M%(N)<15-C THEN
    528'GQEL
516 KL=1'BDVH
518 IF MID$(BB$,M%(N)+15-C,
    1)=" "OR MID$(BB$,M%(N)+16-C,
    1)=" "THEN 528'LKTW
520 J=0'BCSC
522 FOR M=14-C TO 1 STEP-1
    :IF MID$(BB$,M%(N)+M,
    1)=" "THEN J=M:M=0'NBMR
524 NEXT M'BBGF
526 IF J=0 THEN J=15-C'FGXL
528 CC$=MID$(BB$,M%(N)+1,J)'DRWO
530 M%(N)=M%(N)+J'CLYF
532 A$=A$+CC$'CHHG
534 FOR M=0 TO 15-C-LEN(CC$)+1
    :A$=A$+" ":NEXT M'KSQQ
536 IF II=-5 THEN A$=LEFT$(A$,
    LEN(A$)-1)+"[CMDR -]"'JPRR
538 RETURN'BAQK
540 REM********************************
    *******'BMKJ
542 AA$=C$(VAL(LEFT$(L$(II),1))-1,
    P%(L))+" "'FBKN
543 AA$=AA$+C$(VAL(RIGHT$(L$(II),
    1))-1,P%(L))'FEOP
544 M=LEN(AA$)'CGJJ
546 RETURN'BAQJ
548 NN=0'BDAM
550 FOR II=1 TO 5:IF LEN(L$(II))=3
    THEN GOSUB 542:IF M>NN THEN NN=M
    :GOTO 554'NDBS
552 IF VAL(L$(II))>0 THEN
    M=LEN(C$(VAL(L$(II))-1,P%(L)))
    :IF M>NN THEN NN=M'MNGW
554 NEXT II'BCUJ
556 NN=INT((33-NN)/2):A$=""
    :FOR II=1 TO NN:A$=A$+" "
    :NEXT II'LDQX
558 OPEN 4,4'BDAN
560 FOR II=1 TO 5:IF LEN(L$(II))=3
    THEN GOSUB 542:PRINT#4,A$+AA$;
    :GOTO 564'LFAS
562 IF VAL(L$(II))>0 THEN PRINT#4,
    A$+C$(VAL(L$(II))-1,P%(L));'IIXS
564 PRINT#4,""'BCWJ
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566 NEXT II:PRINT#4:CLOSE 4
    :RETURN'EHOO
568 NEXT I'BBCN
570 PRINT#DV,'BDSH
572 PRINT"[CLEAR,RVS]LABEL
    FORMAT"'BAVM
574 GOSUB 158:GOTO 580'CHNM
576 PRINT"[HOME,DOWN8]"'BABN
578 FOR I=1 TO 5:PRINT"LINE"I"=
    [SPACE5,LEFT5]"L$(I):NEXT I
    :RETURN'GNCA
580 FOR J=1 TO 5'DDJJ
582 GOSUB 576'BDVK
584 PRINT"[HOME,DOWN15]
    LINE#"J"= FIELD #"'BBEQ
586 PRINT"[SPACE7,LEFT5]"L$(J)
    :INPUT"[UP]";L$(J)'CMXV
588 IF VAL(RIGHT$(L$(J),
    1))>C+1 OR VAL(RIGHT$(L$(J),
    1))<0 THEN 584'KDAC
590 IF VAL(LEFT$(L$(J),
    1))>C+1 OR VAL(LEFT$(L$(J),
    1))<0 THEN 584'KDXU
592 IF LEN(L$(J))>2 THEN IF
    MID$(L$(J),2,1)<>"+"OR
    LEN(L$(J))>3 THEN 584'MFRY
594 NEXT J'BBDM
596 GOSUB 576'BDVP
598 PRINT"[HOME,DOWN20]
    IS THIS OK? "'BAWV
600 GOSUB 162:IF A$<>"Y"THEN 572'FJHF
602 PRINT"[CLEAR,DOWN]USING
    LABELS"'BALG
604 GOTO 448'BDPF
606 FOR II=0 TO C'DETI
608 IF TL(II)=0 THEN 614'DKYM
610 PRINT T$(II)" ="TL(II)'BMME
612 IF G=1 THEN PRINT#4,
    CHR$(14)"TOTAL "T$(II)"
    ="TL(II)CHR$(15)'GYBO
614 NEXT II'BCUG
616 RETURN'BAQH
618 FOR II=0 TO C'DETL
620 TL(II)=0:NEXT II:RETURN'DLWG
622 FOR II=0 TO C'DETG
624 IF LEFT$(T$(II),1)<>"#"THEN
    638'FNSM
626 IK=VAL(C$(II,P%(L)))'CQCM
628 IF IK<>0 THEN 642'EGUN
630 IK=VAL(MID$(C$(II,P%(L)),2,
    20))'DXJJ
632 IF IK<>0 THEN 642'EGUI
634 IK=VAL(MID$(C$(II,P%(L)),3,
    20))'DXKN
636 IF IK<>0 THEN 642'EGUM
638 NEXT II'BCUM
640 RETURN'BAQE
642 TL(II)=TL(II)+IK:GOTO 638'DSOM
```

END

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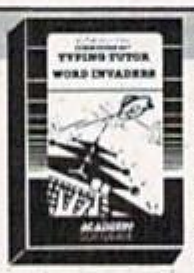

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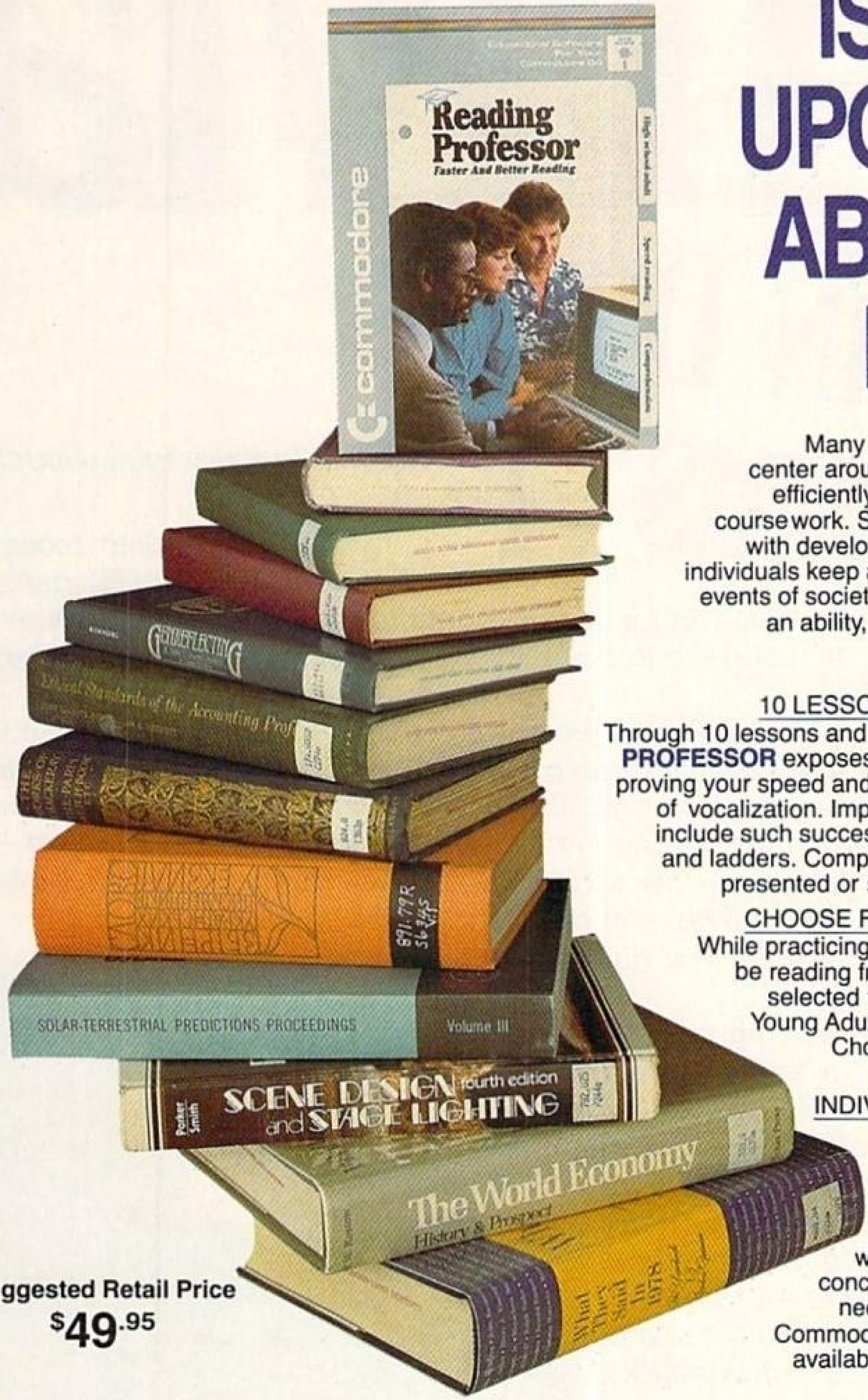
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COMMODORE
EDUCATIONAL SOFTWARE

Our resident trivia experts take a look at some of the most popular trivia games for the Commodore 64.

Trivia

WHEN IN DOUBT, SAY PARIS

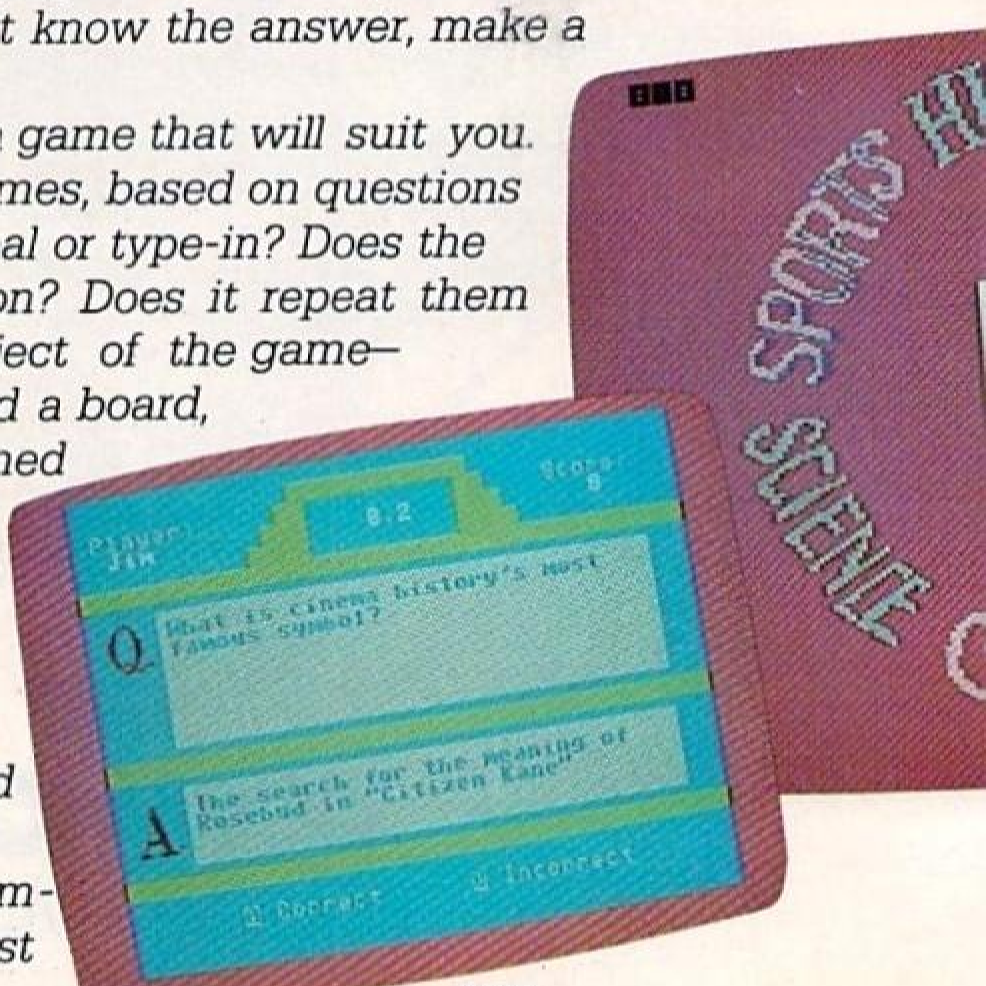
BY JIM GRACELY AND JOHN O'BRIEN

The software market has recently been flooded with computer trivia games. Everyone, it seems, wants to cash in on the computer's ability to simulate the lore and excitement of trivia. It wasn't always like this, though.

First, the board game Trivial Pursuit came along, then the onslaught of games using the computer as a medium. Old-time trivia buffs are now in both ecstasy and agony. Ecstasy because they can now play all the time and because they had a headstart on all the newcomers. But agony because the trivia mystique is over—face it, it's a fad. And there's always a time limit. No longer can you wrack your brains for as long as you please. The new players thrive on quick questions and even faster answers. If you don't know the answer, make a guess and move on, buddy.

Don't despair—there is a computer trivia game that will suit you. Jim and John compared a total of ten games, based on questions like: Are the answers multiple choice, verbal or type-in? Does the game always start with the same question? Does it repeat them often, rarely or never? What is the object of the game—to get the highest score, maneuver around a board, complete a puzzle, reach a predetermined score, be the first to answer a predetermined number of questions? Is the scoring based on speed, percentage, or right and wrongs? What is the necessary ingredient to win: luck, quickness, strategy or knowledge? Is there simultaneous play and do graphics and sound enhance the play?

Jim reviews the first five, while John comments on them. Then John reviews the last five, and Jim comments.



Player: JIM

8.2

Score: 8

Q What is cinema history's most famous symbol?

A The search for the meaning of Rosebud in "Citizen Kane"

1 Correct

2 Incorrect

WORD OF MOUTH

Games

TRIVIA ARCADE

Screenplay
Box 3558
Chapel Hill, NC 27515

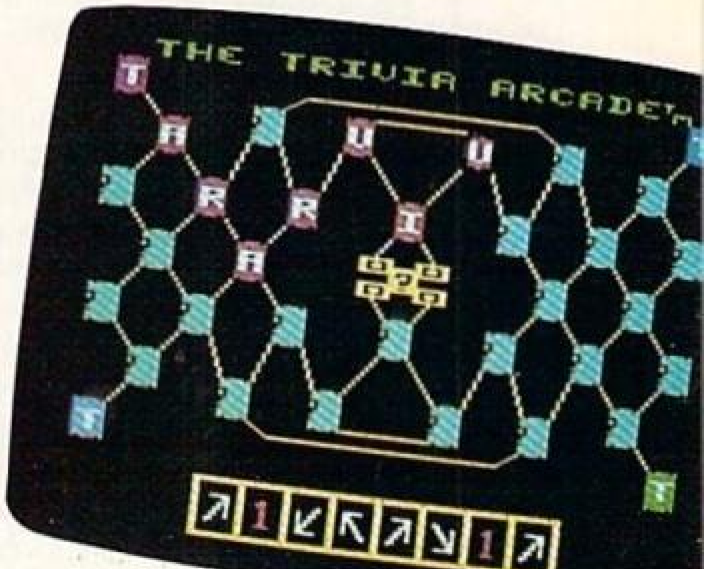
Jim: *Trivia Arcade* uses the recipe of a little arcade action, a simple board game and lots of trivia questions in five categories. A menu screen allows you to choose the number of players, either method of answering (multiple-choice or type-in), whether you want arcade or no arcade, and whether you are using joystick or keyboard.

The game play is a little unusual. First, you have a couple of seconds to sight a category in your crosshairs and blast it. If you don't hit it, your turn is over. But if you do hit the category, you get a question. Answer incorrectly and the next player is up. Answer correctly and you go to the game board. Here you advance one block to a question mark and get one of the letters of the word "trivia." When you have all the letters, you go to the middle for a final challenge of one question from each category. The computer doesn't check to see if you actually have all the letters, so this is on the honor system.

The first player to get all the letters in "trivia" and correctly answer one question from each category wins the game. There is no other scorekeeping in the game.

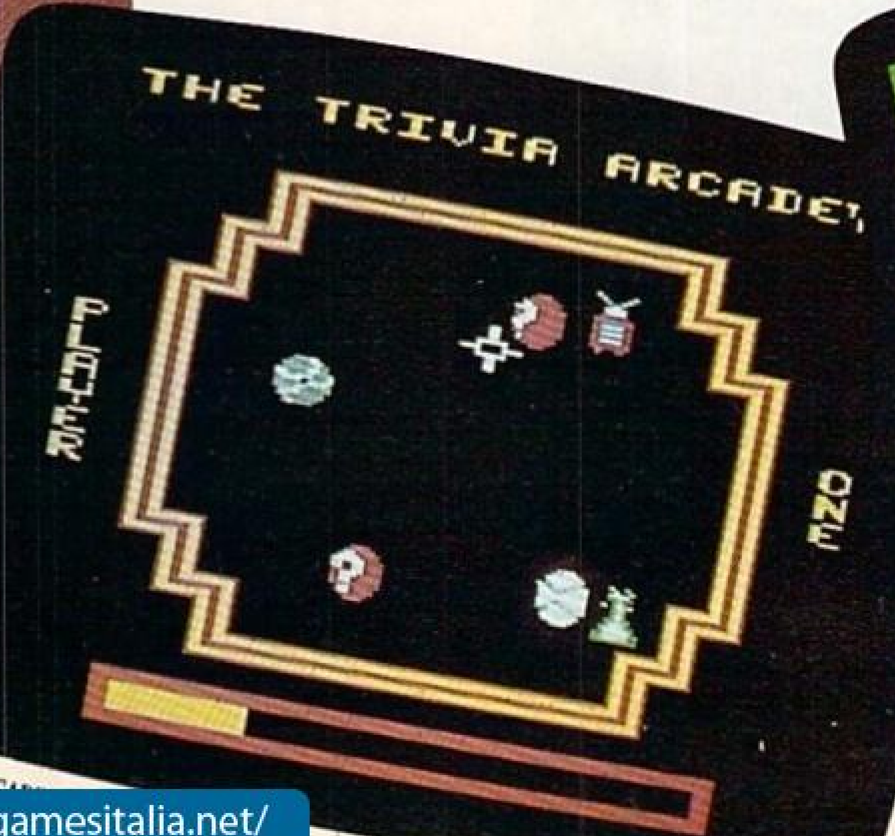
The options of using either multiple-choice or type-in answers and either the joystick or keyboard help to make this game enjoyable to a variety of people. On the negative side, this is not a game for one person. There is no score tracking and therefore no way to compare how you did in one game versus another.

John: It's a nice change of pace to use an arcade-game format on a trivia game. People who are adept with the joystick have the advantage in this one. Usually, I was lucky to get any category at all because of the time limit, while some opponents were able to not only get a category, but always get one that they wanted.

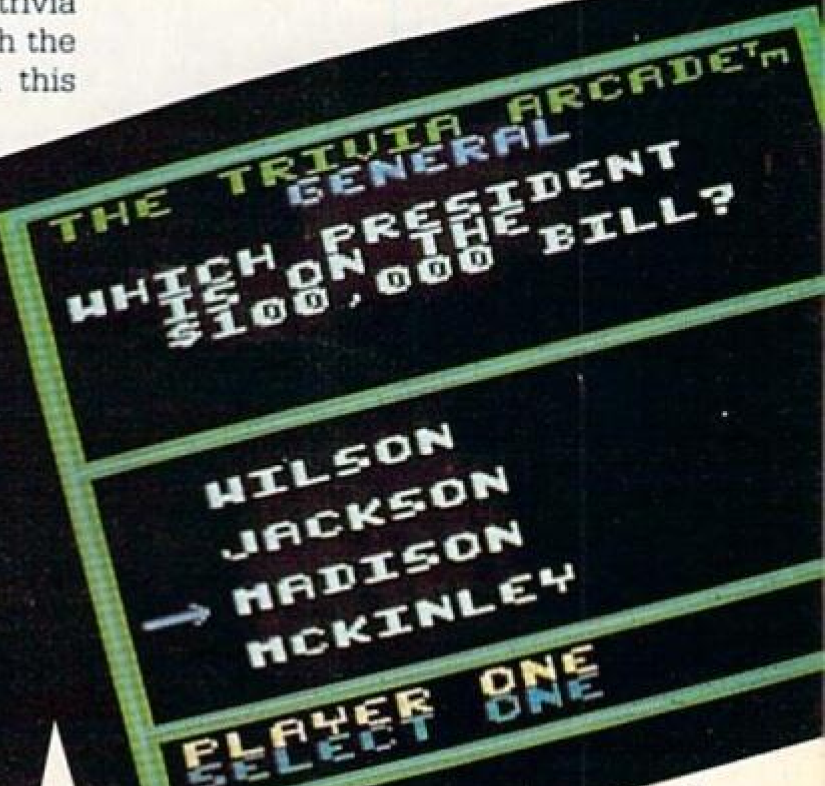


TRIVIA ARCADE

CLASSIC TRIVIA



TRIVIA ARCA



THE TRIVIA ARCADE™
GENERAL
WHICH PRESIDENT IS ON THE $100,000 BILL?
WILSON
JACKSON
MADISON
MCKINLEY
PLAYER ONE
SELECT ONE

TRIVIA ARCADE

TRIVIA FEVER

Professional Software
51 Fremont Street
Needham, MA 02194

Jim: *Trivia Fever* is probably the most versatile of the trivia games on the market. With the whole game on disk plus a book of questions, scorecards, a spinner, bookmarks and little fuzzy animals, this game can be played with or without a computer using a number of play variations. We'll be discussing only the software version.

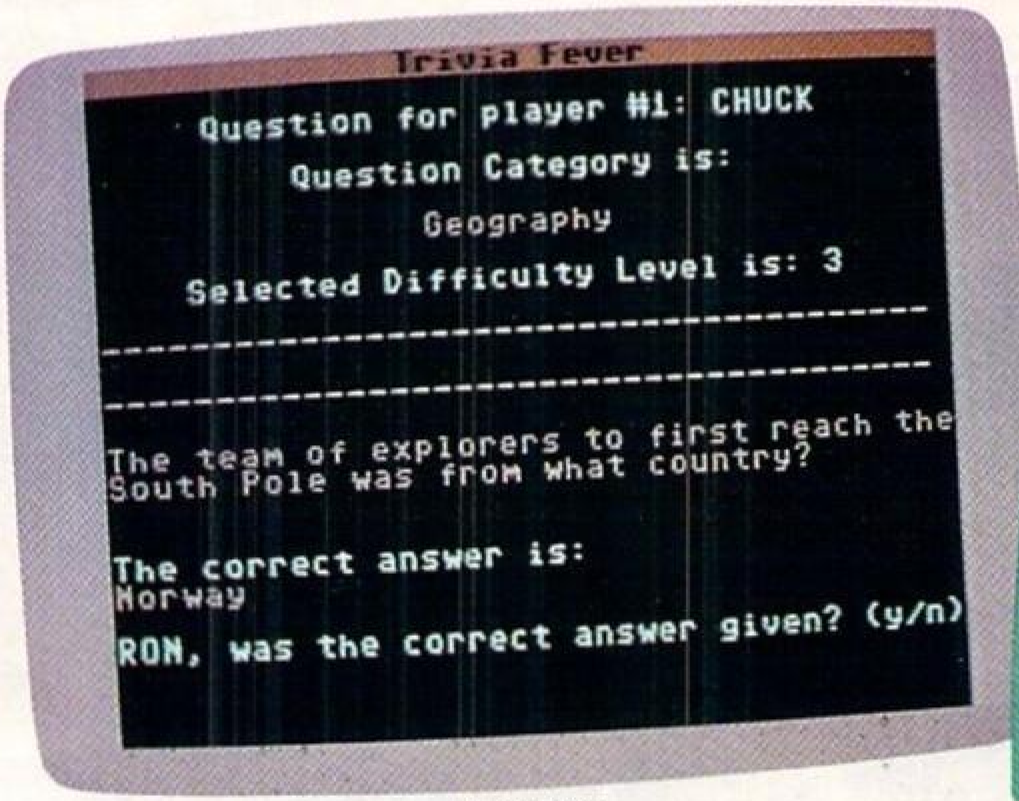
The introductory screens allow you to make choices about the number of players, the number of points required in each category and the length of time to answer a question. A total of seven categories is available and each player may choose five. If you often play with a trivia whiz, you can handicap them in several ways: by randomly selecting their categories, increasing the number of points required in each category or shortening their answering time.

The game is played by selecting one of the five categories for your questions and then choosing a difficulty level of one to three. The points awarded for a correct answer are the same as the level of difficulty. By choosing harder questions, you can attain your required point total faster. Once you have the required point total in a category, you are given a category-completion question. You must answer this correctly to continue. Once you have completed all categories, the computer generates a game-completion question at random. Once this question is answered, you win the game.

The endless combinations and variations make this game very enjoyable. The game can be made to last from less than an hour to several hours by choosing the number of points required in each category. The handicapping feature makes this game enjoyable even against a die-hard trivia buff (if he or she agrees to it, of course). The scorecards and book of trivia questions provide a non-computerized trivia quiz for your own use wherever you might be. The only drawbacks to the game were that each question required at least six key strokes to get through it and the questions seemed to have a rather high repetition rate.

John: Definitely one of the best trivia games. The non-computer version that's included also makes it one of the best values.

UNFORTUNATELY, THE PACE OF *PQ* IS SO FAST, THERE IS REALLY NO TIME TO SIT BACK AND CHAT ABOUT THE LAST QUESTION, OR WHY ONLY YOU KNEW THE ANSWER.

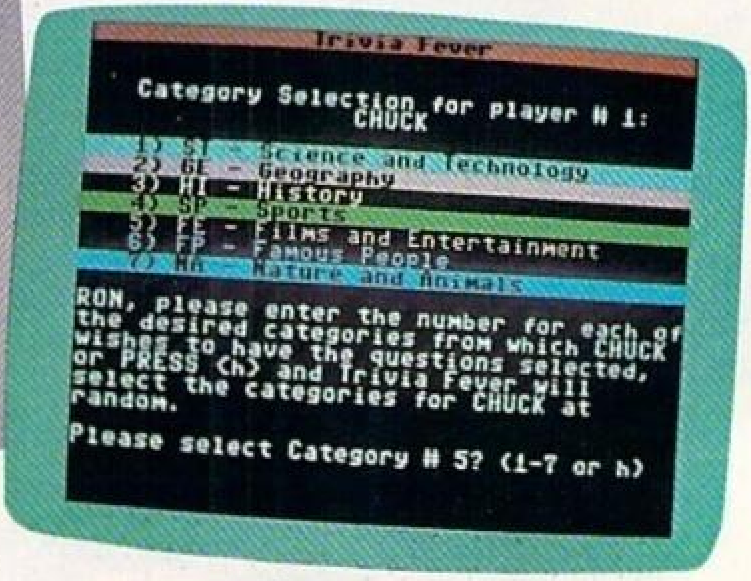


```
Trivia Fever
  Question for player #1: CHUCK
      Question Category is:
            Geography
  Selected Difficulty Level is: 3
-----------------------------------------
-----------------------------------------
The team of explorers to first reach the
South Pole was from what country?

The correct answer is:
Norway

RON, was the correct answer given? (y/n)
```

TRIVIA FEVER



```
Trivia Fever

 Category Selection for player # 1:
                 CHUCK
 1) ST - Science and Technology
 2) GE - Geography
 3) HI - History
 4) SP - Sports
 5) FE - Films and Entertainment
 6) FP - Famous People
 7) NA - Nature and Animals
RON, please enter the number for each of
the desired categories from which CHUCK
wishes to have the questions selected,
or PRESS (h) and Trivia Fever will
select the categories for CHUCK at
random.

Please select Category # 5? (1-7 or h)
```

TRIVIA FEVER

PQ—THE PARTY QUIZ

Suncom
260 Holbrook Drive
Wheeling, IL 60090

Jim: *PQ* is a trivia game for parties. With the four controllers supplied with the game, up to four players can participate while sitting up to six feet away from the screen.

This game can be modified to fit your schedule and thinking speed by allowing you to adjust both the response time allowed and the number of rounds of play. The most interesting option is the choice of either the social or competition modes. In the competition mode, the first person to correctly answer the question receives all remaining points (points decrease with time left to respond). In the social mode, each player who answers correctly gets the point value for the time at which they responded. In real life, the social mode is more competitive because you eliminate the blind guesser who happens to get a couple of questions correct without even reading the question.

For those who become adept at the game, there are six supplemental question disks available. These include sports, entertainment, and even a Bible edition.

The game play consists of a selected number of rounds. Each round contains ten questions. The question is displayed on the screen for a moment before the answers are shown. Once the answers are displayed, the clock and points for a correct answer start ticking down. If you select the correct answer, your score turns yellow, an incorrect answer and your score turns purple. The scores are updated when the correct answer is selected by any player (competition) or all players have made a selection (social). The questions cover topics from many categories, but are selected at random without any specification as to the category of the question.

Once every five rounds there is a lightning round. In this round, each player plays alone. You get ten seconds to answer as many of ten questions as you can (different for each player). This round requires speed in reading the question and the ability to know when to take a guess. Your score from this round is based on the number of correct answers out of ten and the time it took to answer each.

The winner of the game is the player who has the highest score. High scores are also saved to disk so you can play against your highest score or eliminate someone else to beat it.

This game is thoroughly enjoyable and is an ideal addition to the collection of the computerist and trivia buff alike. If I had to pick out any weakness, it would have to be that the pace of the game is so fast, there is really no time to sit back and chat about the last question, or why only you knew the answer. There is a pause feature built in, but who wants to miss a question trying to find the keyboard?

John: It's a good thing that they included "The Party Quiz" as part of the title. If you're playing alone, the game may not impress you. When playing with a group, though, *PQ* really comes into its own. The game is like a good book—you can't put it down. The lightning round is a great feature because you always have a chance to catch up. The special controllers included with the package are also a nice touch.

TRIVIA PLUS

Academy Software
Box 6277
San Rafael, CA 94903

Jim: This is the only game we looked at that allows the non-spermologist to compete against a denizen of datum. This game combines a good portion of strategy along with the usual helping of trivia questions.

Initial setup allows the choice of a scored or no-score game, a time limit for answers, the number of points required to win (scored game only) and whether you want the challenge option.

The real excitement of *Trivia Plus* is in the challenge option. With this option, both players can gain or lose points on each question. Once a question has been asked, the player currently up can either answer or pass the question. A challenge player then either agrees or disagrees with the answer. The current player receives two points for a correct answer and zero for an incorrect answer or pass. If, however, the player gives an incorrect answer and the challenger agrees with him, then the player still gets one point. The whole scoring system is described in the documentation.

The category of the question is chosen at random by the computer and you can either take a question from that category or have it pick another (only once). The "humanities" category is especially interesting because the questions are about songs that the computer actually plays for you.

The challenge option in this game make it a fun game for people of all skill levels and the musical "humanities" add an interesting touch. The program is also very good about repeating questions. Each time you play, it tracks the questions that have been asked and won't repeat any question until all 3,500 have been used.

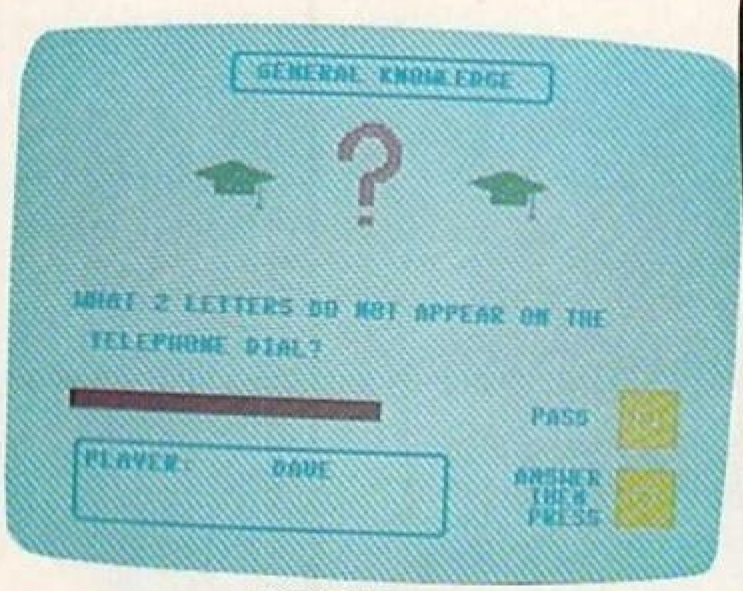
John: The only complaint I have about this game is that it always shows the correct answer even if the player passes on a question. It satisfies curiosity, but uses up the available number of questions faster.

FAX

Epyx
1043 Kiel Court
Sunnyvale, CA 94089

Jim: *Fax* is a one- or two-player game that was one of the first on the market. The game is a test to see how long you can continue to answer questions. The questions for a game can be selected from one of the four available categories. Once a category is selected, it remains for the entire game. Game time is ticked off on your

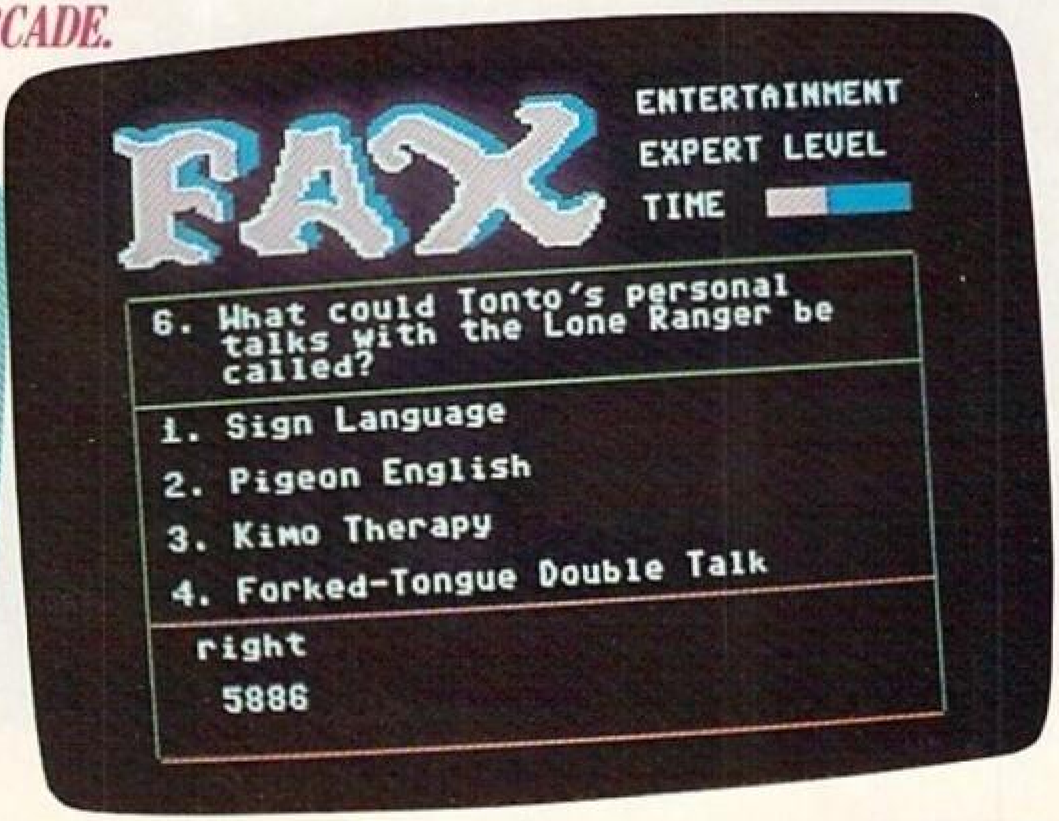
IT'S A NICE CHANGE OF PACE TO USE AN ARCADE-GAME FORMAT ON A TRIVIA GAME. PEOPLE WHO ARE ADEPT WITH THE JOYSTICK HAVE THE ADVANTAGE IN *TRIVIA ARCADE.*



WHAT 2 LETTERS DO NOT APPEAR ON THE TELEPHONE DIAL?

PLAYER: DAVE

TRIVIA PLUS



ENTERTAINMENT
EXPERT LEVEL

6. What could Tonto's personal talks with the Lone Ranger be called?

1. Sign Language
2. Pigeon English
3. Kimo Therapy
4. Forked-Tongue Double Talk

right
5886

FAX

master clock whenever you are thinking about an answer. Each time you get to a pre-determined bonus level, you move up one level of difficulty and get time added back to your category.

The game is played until you run out of time on your master clock. At that point, whoever has the higher score wins. The clock stops when either player answers correctly. The strategy in this game is in the choice of either taking a guess and using up less time (but possibly gaining no points) or taking a little longer and getting sure points.

There is a little graphic routine which can be selected or turned off after each response. If you want time to talk about the question and the various answers, then turn this graphic on. Otherwise the questions just keep coming.

Overall, this is a nice trivia game with a wealth of questions. The only problem I found was that the repetition rate of the questions was pretty high. Even during a short game, questions were repeated.

John: *Fax* isn't the best of them, but a good addition to the trivia buff's collection. It would be nice if they had a longer response option available for novices.

WORD OF MOUTH

Dilithium Press
8285 SW Nimbus
Beaverton, OR 97005

John: This trivia game is not for the faint of heart. It features more difficult and obscure questions than most trivia games and there's no multiple choice to help you guess. You can choose your level, but even the lowest level is as difficult as some other games' higher levels. It has a time limit with an optional 10-, 20- or 30-second timer, but even 30 seconds puts pressure on players. Whether this is good or bad depends on how good you are.

A nice feature of *Word of Mouth* is that the music capabilities of the 64 are used in music-related questions. Also, you can pick your play level or have the computer decide for you by taking the "brainpower" quiz to determine what level you should play. You can use this to handicap players of different knowledge levels. If one player takes the quiz, all players must.

Correct answers are worth ten points, but you can choose to take a harder question for 20 points, which adds some strategy to the game. It's a risky maneuver, but if you need to catch up fast, it's like the three-point shot in basketball—sometimes it's worth the risk.

The player with the most points wins and players get the option of ending the game with a set number of points, a specific number of rounds or a set time limit. *Word of Mouth* claims to have over 25 categories, but you can't choose a category and have to take whatever question comes up. The questions seemed fairly heavy in history.

At any time during the game, you can go to a scoreboard screen to see how you're doing. It shows the scores of all players and the percentage of correct answers.

Jim: The idea of a quiz to set your watt rating (the system used to determine your skill level in this game) reminds me of Bowling 101 in college. If you purposely bowled terribly on the first class, you could just breeze through the rest of the semester. Most people know the abilities of their opponents, so why not handicap manually?

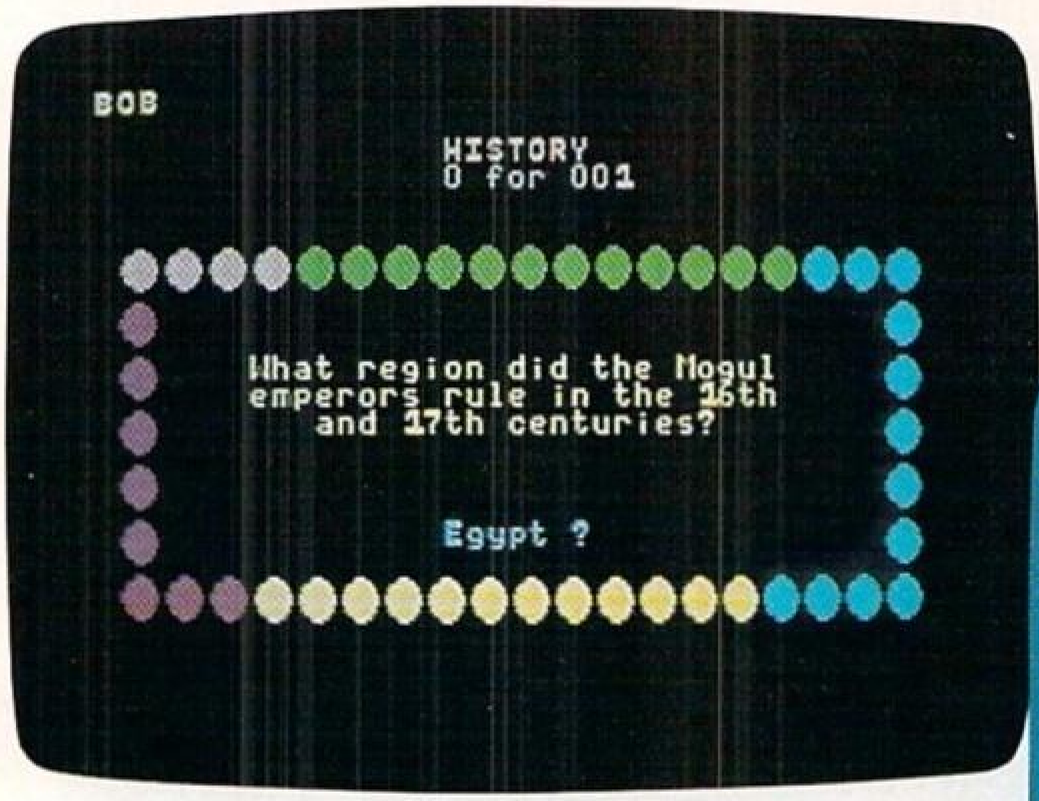
The set time limit for a game, though, is an asset. There's sometimes no way to end a trivia game without an argument except by agreeing ahead of time how long you want to play.

CLASSIC TRIVIA IS A GAME WHERE EVERYONE'S HINDSIGHT SHINES.

CLASSIC TRIVIA

Classic Software
310 Franklin Street
Boston, MA 02110

John: *Classic Trivia*, formerly *Uptown Trivia*, bills itself as the game for non-volatile memories. If volatile means "unstable," then they're not kidding—this game is a real challenge.



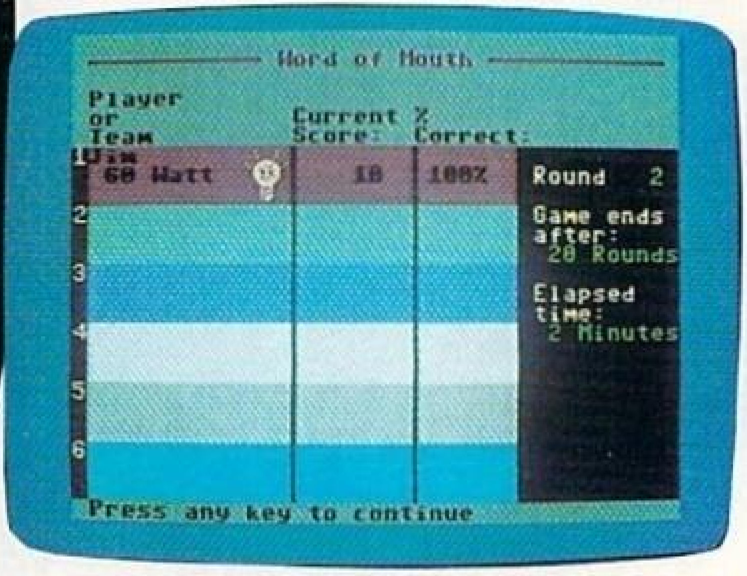
```
BOB

HISTORY
0 for 001

What region did the Mogul
emperors rule in the 16th
and 17th centuries?

Egypt ?
```

CLASSIC TRIVIA



```
———————— Word of Mouth ————————
Player
or                Current %
Team              Score:  Correct:
1 Jim                                 Round   2
  60 Watt            10    100%
2                                     Game ends
                                      after:
3                                      20 Rounds

4                                     Elapsed
                                      time:
5                                      2 Minutes

6

Press any key to continue
```

WORD OF MOUTH

It's hard sometimes to remember the name of something when you're asked a question outright. Multiple-choice is usually a little easier; it helps jog your memory when you see the correct answer or you can eliminate some of the answers and narrow it down. This game adds a nasty but fun twist to the multiple-choice format: the choices are on the screen one at a time and you just hit yes or no for each.

The tricky part is that once you say no to the first choice, you cannot go back to it. It's frustrating if you wait for the last one and realize it is a joke answer or one that is obviously wrong. The computer won't show the answer if the question is answered incorrectly. This is good because when the question comes up again, it is still a challenge.

There are six categories and they are chosen at random. The categories aren't exactly original, but are good choices: sports, science, geography, history, arts and revue. The revue category can be a question about almost anything. The winner is the first to answer three questions correctly in each category. You are given the option to change the number of questions needed to complete a category from one to nine. High scores are given but not recorded on the disk.

The format is challenging, but not too frustrating to be fun. *Classic Trivia* has the most questions of any of the trivia games we've seen, and more disks are available. Put this one near the top of the list.

Jim: This is a very good, but very tough game. The way the multiple-choice is handled really adds excitement. It's just like the TV game Let's Make a Deal. Should you keep what you have or try for what's in the next box on stage? This is a game where everyone's hindsight shines. Once you've cycled through all of the answers and gotten stuck with the last one, everyone else knows which one must have been correct.

The scoring in this game is also nice. You have a predetermined number of questions to answer correctly in each category. If you get three out of three, you score 100 points for that category. Three out of six and you get 50 points. You can check on your point totals at any time and the game displays your points each time a category comes up.

FACTACTICS

Daystar
525 University Avenue
Palo Alto, CA 94301

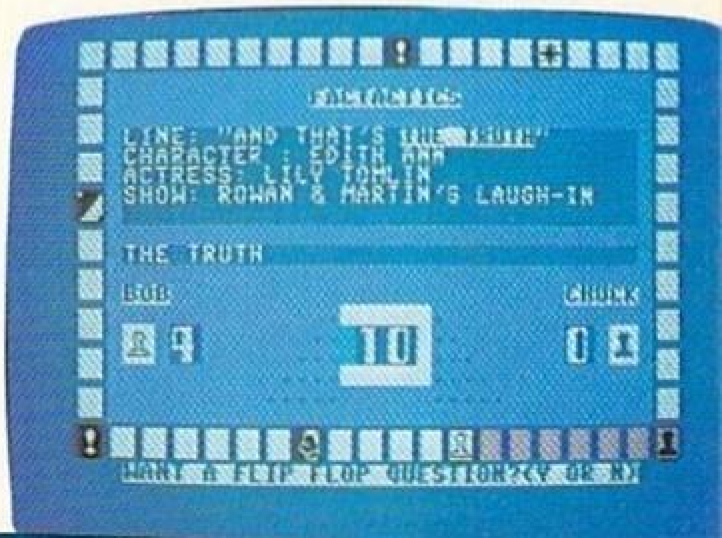
John: *Factactics* is one of the few trivia games that uses strategy as an important part of winning. In some of the trivia games, strategy plays a small part in winning, but nothing like *Factactics*. In this one, how you play is almost as important as what you know.

The number of play options available is amazing. You can even choose not to have strategy in the game. You can play facts plus tactics, just the facts, or customize your own game using any of the possible options. You can play with or without a timer on questions. You can play an entire game of one category or play the "big mix," where questions are drawn from all the categories. The categories are a good mix if you like entertainment-oriented questions: TV, sports, movies, rock and roll, music potpourri and Americana.

When you play with the tactics option, which I strongly recommend, the game is laid out like a board game. The idea is to move around the board by answering the questions correctly. There are a few things standing in your way. You are racing against a little character called "the wise guy" who moves a few spaces after each question. Once he completes one trip around the board, the game is over. There are ways to keep him from moving too fast, and that is where the strategy comes in.

There are several markers on the board that you have the option to use when you land on one. There are bonus questions that are worth more, and when you answer them correctly, the wise guy does not move. There is also a freeze marker that keeps him from moving for a turn. The most interesting marker is the flip flop. If you answer it right, then you trade places with the wise guy. This option can really make or break you. Every time you use one of these markers, their position changes on the board. The best strategy just may be to sometimes answer a question incorrectly in order to get the marker moved to a better position.

The questions themselves are good and they are usually in the format of a statement with a blank spot to fill in. There is also some true-and-false thrown in. The game comes with 2,000 questions. If you choose to play in one category, the questions will start to repeat—if you last long



FACTACTICS

LINE: "AND THAT'S THE TRUTH"
CHARACTER : EDITH ANN
ACTRESS: LILY TOMLIN
SHOW: ROWAN & MARTIN'S LAUGH-IN

THE TRUTH

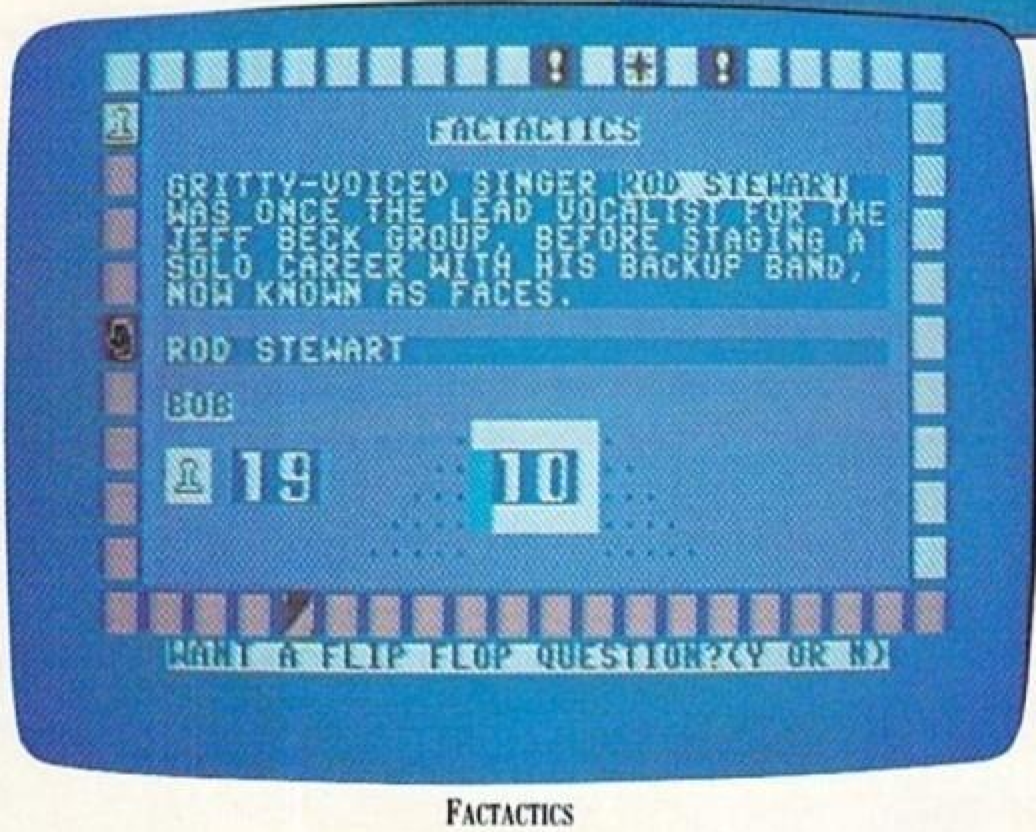
BOB 9

10

CHUCK 0

WANT A FLIP FLOP QUESTION?(Y OR N)

FACTACTICS



FACTACTICS

GRITTY-VOICED SINGER ROD STEWART
WAS ONCE THE LEAD VOCALIST FOR THE
JEFF BECK GROUP, BEFORE STAGING A
SOLO CAREER WITH HIS BACKUP BAND,
NOW KNOWN AS FACES.

ROD STEWART

BOB 19

10

WANT A FLIP FLOP QUESTION?(Y OR N)

FACTACTICS

enough. When the question is repeated, though, it usually has a different part of the statement blanked out. This helps keep the questions fresh.

To answer, the player types in the correct answer. It will allow you a certain amount of leeway in your spelling, unless the answer is very short or if it is a number. This is especially helpful if your spelling is not perfect.

Factactics is one of the good ones. The strategy makes it excellent and it's the best of the trivia games to play solitaire.

Jim: My reaction to this game was that there was less strategy than luck. Sure, you have to figure out how to beat the wise guy around the board, but the location of the special markers is all luck. Maybe I'm just annoyed because I never thought of trivia as a game that should or could be played against a computer.

TRIVIAL COMPUTE: WORLD CLASS EDITION

Trivial Compute
3527 Oak Lawn Avenue
Dallas, TX 75219

John: *Trivial Compute* is the trivia game with "snob" appeal. The game comes with fancy invitations and classy questions. At the end of the game, you are rated on a list that goes from Pauper at the low end to Royalty at the best. In between, there are lots of ratings: Middle Class, Social Climber, Social Elite and Aristocrat. If this "high class" appeal sounds bad—don't be too hasty. Fortunately, this game plays a lot better than it may sound.

The computer loads ten questions at a time and then boom—they come up fast and your score depends on a quick response. It demands concentration and quick decisions. The questions are all either multiple-choice or true-and-false. You pick one of the four answers by hitting one of the four function keys, so some coordination is required. (Some people may claim to have hit the wrong key rather than admit they got the answer wrong because they didn't know.)

There are many obscure questions about fox hunting and Jackie O, but with multiple-choice or true-and-false, it's never impossible. It's also one of the few places where reading gossip rags will come in handy.

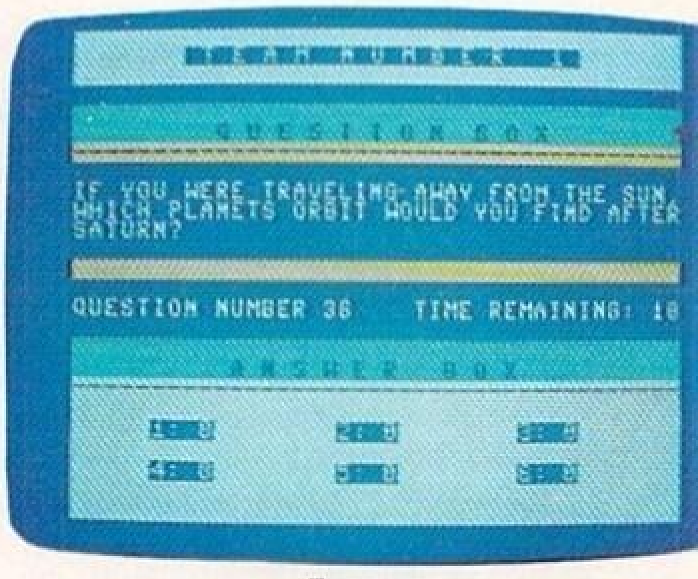
Jim: There are some minor technical problems with this game that occasionally arise. Once in a while the text on the screen will shift so that the questions or answers are mixed up. Also, sometimes the game will signal that your answer is wrong and move on without showing the correct answer. This seemed to occur on questions where the answer was actually correct.

Aside from these problems, this is a game designed for real fun. How many of your friends know the name for the world series of cricket? (The Ashes—a sports expert question.) There is even some humor thrown in. (Did Paul McCartney marry Linda Kodak, Eastman or Polaroid?)

TRIVIALITY

AC3L Software
Box 7
New Derry, PA 15671

John: *Triviality* is probably the most unusual of the trivia games. It has only 500 questions (the least of any of the games) but has an added dimension that helps offset this. With this game, you can add ten of your own questions to the game or change any or all of the questions to make

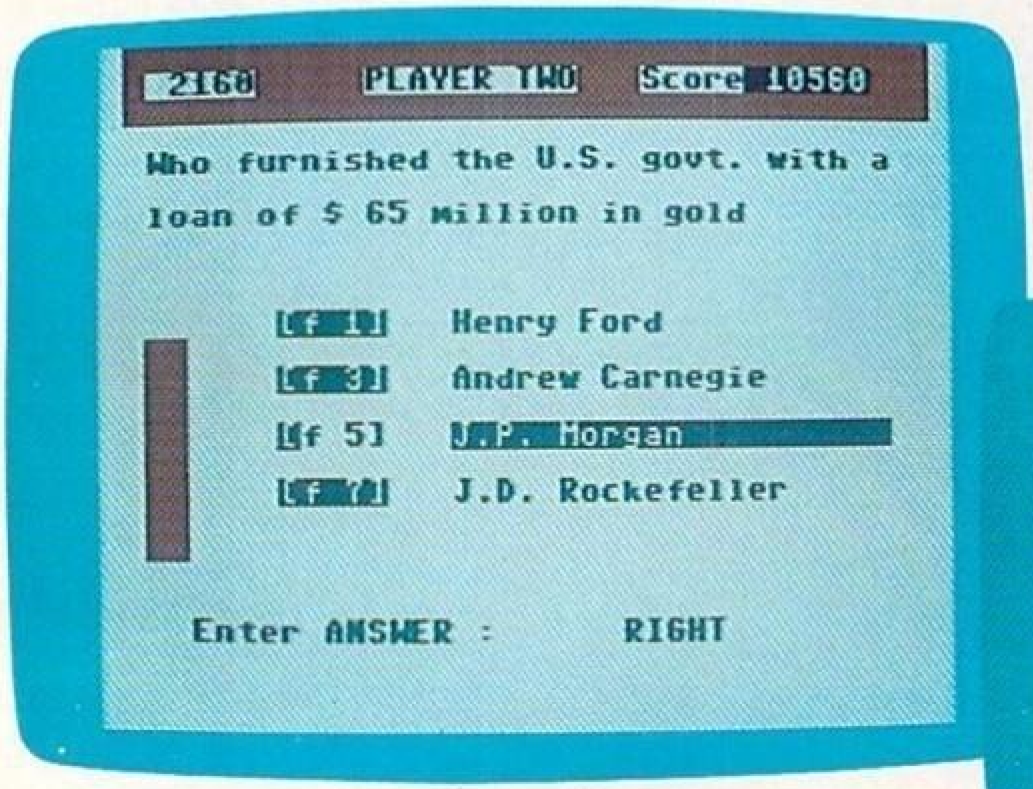


```
IF YOU WERE TRAVELING AWAY FROM THE SUN
WHICH PLANETS ORBIT WOULD YOU FIND AFTER
SATURN?

QUESTION NUMBER 36    TIME REMAINING: 10
```

TRIVIALITY

HOW MANY OF YOUR FRIENDS KNOW THE NAME FOR THE WORLD SERIES OF CRICKET? THERE'S EVEN SOME HUMOR IN *TRIVIAL COMPUTE*—DID PAUL McCARTNEY MARRY LINDA KODAK, EASTMAN OR POLAROID?



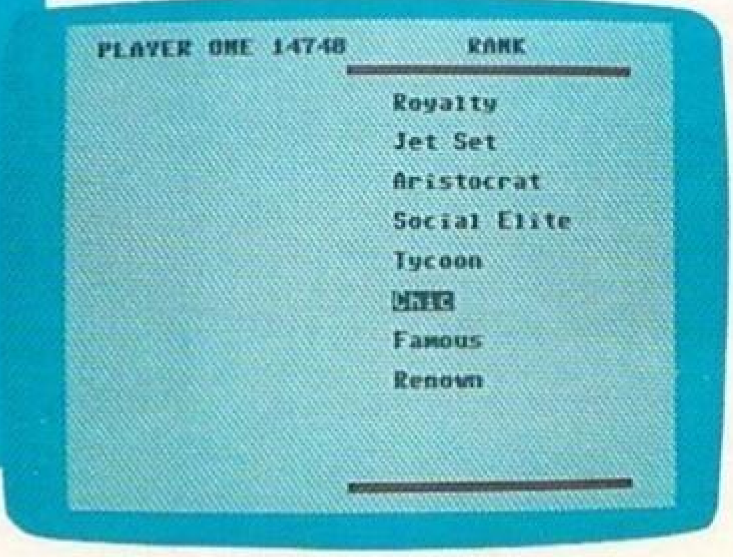
```
 2160     PLAYER TWO    Score 10560

Who furnished the U.S. govt. with a
loan of $ 65 million in gold

     [f 1]  Henry Ford
     [f 3]  Andrew Carnegie
     [f 5]  J.P. Morgan
     [f 7]  J.D. Rockefeller

  Enter ANSWER :      RIGHT
```

TRIVIAL COMPUTE: WORLD CLASS EDITION



```
PLAYER ONE 14748        RANK

                   Royalty
                   Jet Set
                   Aristocrat
                   Social Elite
                   Tycoon
                   Chic
                   Famous
                   Renown
```

TRIVIAL COMPUTE: WORLD CLASS EDITION

your own game.

Scoring in *Triviality* is out of the ordinary. When you answer a question correctly, you get 20,000 points. You also get a bonus by multiplying 40 and the question number (the questions are numbered consecutively from 1 to 500). This makes luck a major factor in the game, because a person might answer many more questions than his opponent but still lose because the questions he answered correctly were from the lower order.

Players have an option to pass a question and lose 5,000 points. This comes in handy when you're sure you don't know the answer. If you answer incorrectly, then you lose 10,000 points. The winner is the player with the most points at the end of five rounds. There are two questions in each round.

The game is actually pretty good and so are the questions—I just wish there were more of them. *Triviality* is the only game that lets you use the game as a data base if you get tired of playing trivia.

Jim: The random factor of the question numbers in this game is not really that bad. It would be nice if the higher numbered questions were harder, but there is another way of looking at it. You lose 10,000 points on a wrong guess and 5,000 on a pass. If you answer question number one correctly, you get 40 bonus points. Answer question 500 correctly you get 20,000 (40 X 500) bonus points. I would rather guess on question 500 and take a chance at that bonus than guess on question one. This adds a little more strategy to the game.

So there you have it, a comprehensive look at ten trivia games. And remember, the only real rule of the game is that you'd better know the answer. But according to our trivia experts, who have done extensive research on the subject, when you're in doubt about an answer, say "Paris."

How They Rate

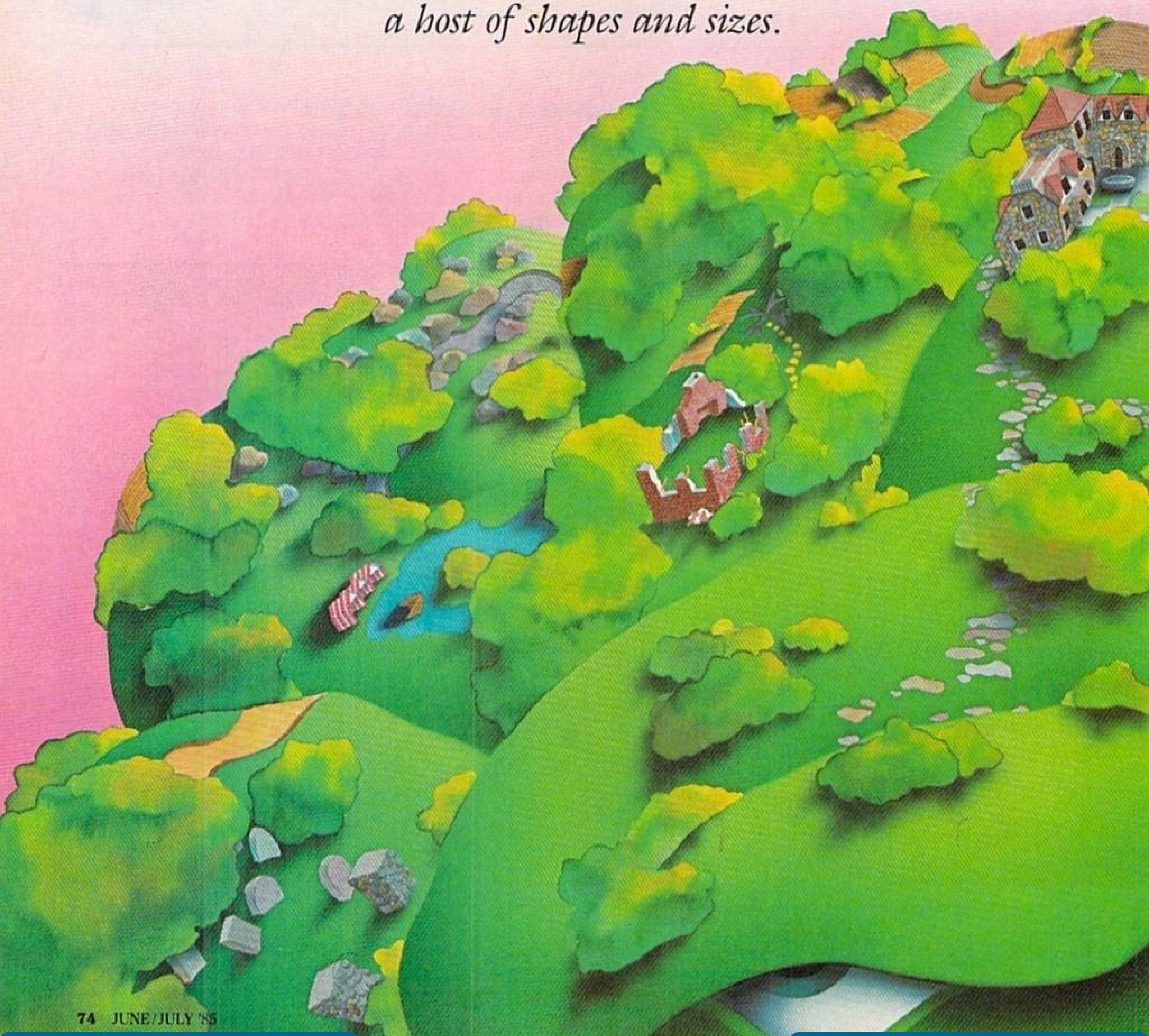
1. NUMBER OF QUESTIONS **2.** NUMBER OF PLAYERS **3.** ANSWERING (M) MULTIPLE CHOICE (T) TYPE IN ANSWERS (V) VERBAL ANSWERS **4.** REPETITION RATING 1 (POOR)-10 (GREAT) **5.** OBJECT OF GAME (H) HIGHEST SCORE WINS (B) BOARD GAME (M) MISC. (F) FIRST TO GET TO A PREDETERMINED SCORE (A) FIRST TO GET A PREDETERMINED NUMBER OF QUESTIONS CORRECT. **6.** SCORING (S) SPEED (P) PERCENTAGE CORRECT VS. ASKED (R) FLAT POINTS FOR RIGHT OR WRONG. **7.** % TO WIN (Q) QUICKNESS (S) STRATEGY (K) KNOWLEDGE (L) LUCK **8.** CAN MORE THAN ONE PLAYER COMPETE SIMULTANEOUSLY **9.** SOUND **10.** GRAPHICS **11.** TIMED RESPONSES **12.** MULTIPLE CATEGORIES **13.** CHOICE OF CATEGORIES

NAME OF GAME	1	2	3	4	5	6	7	8	9	10	11	12	13
TRIVIA PLUS	3500	6	V	9	F	R	50%–S 50%–K	N	Y	Y	Y	Y/8	N
CLASSIC TRIVIA	3600	10	M	8	H	P	100%–K	N	Y	Y	N	Y	N
TRIVIA ARCADE	3500	4	M, T	9	M	NONE	20%–S 30%–L 50%–K	N	Y	Y	N	Y/5	Y
TRIVIAL COMPUTE	1000's	6	M	7	H	S	50%–Q 50%-S	N	Y	N	N	Y	Y
TRIVIA FEVER	1000's	8	V	6	A	R	20%–S 80%–K	N	Y	N	N	Y/7	Y
FAX	3700	2	M	1	H	S	40%–Q 60%–K	Y	Y	Y	Y	Y/4	N
PQ PARTY GAME	2500	4	M	6	H	S	40%–Q 60%–K	Y	Y	Y	Y	N	N
FACTACTICS	2000	2	T M	5	B, H	R, S	40%–S 60%–K	N	Y	Y	Y	Y	Y
WORD OF MOUTH	1700	6	V	6	H	R	100%–K	N	Y	Y	N	Y	N
TRIVIALITY	500	6	V	8	H	R	10%–S 30%–L 60%–K	N	Y	N	N	N	N

HOT ROLES:

Some Food for Thought

Armed with the Commodore 64, players can now enter an unending variety of imaginary lands in a host of shapes and sizes.



By Mark Cotone

In the late sixties, there was the Castle and Crusade Society, the premier organized league in the role-playing genre. They were keepers of the fictitious "Great Kingdom" and spent hours devising laws, developing maps and monitoring the interpersonal behavior across their vast mythical lands.

The Society's undeniable influence might best be exemplified by the work of former member Dave Arneson. In the early seventies, he teamed with E. Gary Gygax, to give us TSR's Dungeons and Dragons, a boxed set of rules and disciplines which finally gave the throngs of anxious adventurers a banner to assemble under. In this boardless journey, one participant takes on the duties of "dungeon master," where he or she uses wit and fancy to design the parameters of a make-believe world. After the world is completed, the other players generate imaginary personality profiles and delve into the unknown with verbal banter.

This Dungeon and Dragon outline could be viewed as a blueprint of the computer translations that were soon to come. Don Wood and Will Crowthers were the first to bring this magic to micro, on the mainframe at Stanford University. Appropriately entitled *Adventure*, this ground breaking all-text contest set the stage for many of today's projects. In essence, the computer acted as dungeon master, officiating the playground while giving swift, unbiased results to any action input.

But where the illusionary worlds of yesteryear were available only to those select few who could access the college-owned machines, the modern roads for wizards and warriors are many. Armed with the Commodore 64, players can now expose themselves to the elements of a seemingly unending variety of imaginary lands in a host of shapes and sizes. An attempt to review them all would require a manuscript of encyclopedic proportions. Instead, we will take a look at some of the more popular releases in two highly diverse styles of play: the all-text games and the mysterious maze adventures.

The all-text game excludes all on-screen graphics and uses word power to evoke ghastly images, while the maze adventures place you in a labyrinth filled with assorted delights and dead ends. A study of these conflicting approaches might give prospective voyagers a chance to taste the ingredients that make each type so attractive.

GREG PURDON

The Prose Pros

*A*nyone who has ever claimed to like the book better than the movie can attest to the advantage the written word can sometimes have over its visual counterpart in capturing the imagination. If developed correctly, a story can often suspend disbelief and draw the reader into its fertile environment. With linguistic bait, the author can coax readers into creating their own personal, *credible* atmosphere. This is the potential and goal of an all-text adventure and no one is better at it than Infocom.

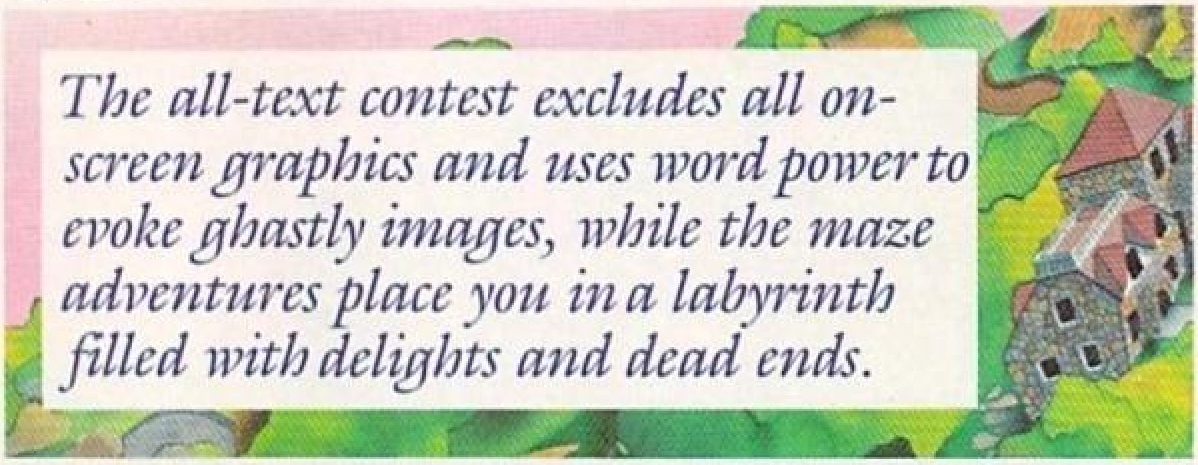
Once again we turn to a university computer for a substantial piece of gaming history. This time it's M.I.T.'s mammoth machine, where programmers Marc Blank, Dave Lebling and Joel Berez joined to create *Zork*, a fascinating search through treasure-filled caves inhabited by murderous thieves, evil wizards and starving dragons. There were no graphics and no animation. Just words.

The game was an instant hit. So the designers seized the wave of enthusiasm and quickly formed Infocom. Today, many consider the *Zork* package the classic, definitive adventure; a model by which all others are judged. And fortunately for their fans, this company refuses to rest on its laurels. No sooner did the confetti settle from their initial achievement, when they invited Commodore users to gallantly step into another mystical world, a journey casting the player as a novice wizard about to be force-fed a sobering dose of surrealism.

Enchanter is an engrossing prose puzzle of cerebral sorcery with a rather unique twist. It seems that the notorious warlock, Krill, has gripped your homeland in a villainous stranglehold, spreading hell's dark fear from coast to groveling coast.

The Circle of Enchanters, a collection of distinguished erudite mystics who could never enter the badlands undetected, have chosen you, an unassuming apprentice of limited stature, to invade Krill's castle, dodge demonic danger and ultimately destroy the heartless dictator.

After a briefing from your close friend and mentor, Belboz, you pick up your pauperized spellbook and courageously march into the brewing storm. With quick wit and common sense your only weapons, you must unravel enigmas, find nourishment, sleep, analyze your dreams, talk to the animals, rendezvous with a lost *Zork* explorer, summon up spirits, cast spells and actually die before you can undermine Krill's stronghold. Success in the whole affair really boils down to your ability to locate hidden scrolls and correctly implement your new found magic to overcome a profusion of pitfalls.



The all-text contest excludes all on-screen graphics and uses word power to evoke ghastly images, while the maze adventures place you in a labyrinth filled with delights and dead ends.

Sorcerer, the second and most recent segment in this series barely gives you time to catch your breath before it heightens the pace. As the curtain draws back, you are given a bit of good news. For whether or not you completed *Enchanter*, you are still given credit for deposing Krill. But don't be so eager to pat yourself on the back, because the bad news is that, since you've completed this valiant deed, you're now expected to be stronger, quicker and smarter. Thus, the challenge has become that much harder.

Your mission: Belboz, leader of the guild and special bosom buddy, has been wizard-napped by the omnipotent demon, Jeearr, who now controls his mind and body (a devastatingly vile one-two combo). You must now save your friend and squelch the satanic foe.

Here you go again. Provided that you can find a way out of your lodgings—it's not the door and took me three hours to discover—then you embark on an incredible journey that takes you over and under some of the most imaginative surroundings ever incorporated into a computer game. Guided by potent prose, you explore amusement parks (complete with rides and concessions), abandoned forts, mind-bending mirror mazes, caves, castles pits and a subterranean world where you can actually visit some locations from the original *Zork*. Once again, it's the correct use of scrolls, spells, potions and objects that will lead you to your nemesis.

Also included in this package is an Infotater, a spinning reference wheel that will help acquaint you with the bizarre creatures roaming the countryside, as well as aid in cracking the combination to open the chest in the Guild's basement.

To play either of these two contests is to become entrapped in a wonderful word web of tricks, quips, frights and delights. This is another triumphant beginning to a series that is bound to follow its predecessor into the hall of classics.

The stories themselves are spellbinding, obviously a product of writer-turned-programmer and not vice versa. And since the player is taking an active role in the structure of the plot, the character doesn't merely represent you, it *is* you! How you act and react to the situations that arise stems from your own personality, not predetermined choices. And since Infocom surely knows how to tune and manipulate that graphics generator nonpareil that we commonly call the human brain, even though no pictures are conveyed on the screen, the visuals we conjure are both intimate and spectacular.

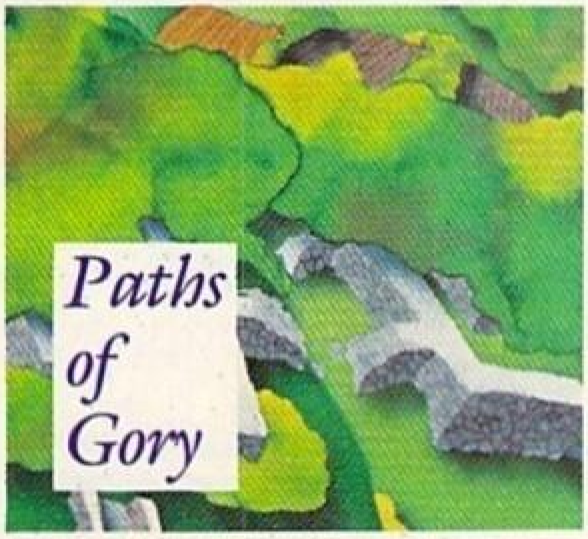
The puzzles spread throughout your surrogate's travels are logical, intricate and tough. But all the answers are readily available, and hindsight will leave you wondering how you could have absent-mindedly stumbled over so many clues.

But perhaps the most appreciated attribute is the Infocom-devised parser technique called Interlogic. It has an unusually diverse vocabulary of over 600 words (1000 in *Sorcerer*)

Maze Master *is deep in strategy and action.*

and allows for the formation of complex sentences and multiple commands. Anyone who has ever resorted to keying in unprintable obscenities out of sheer communication frustration will undoubtedly sigh in relief. This program has brains.

In a world of 64K computers, it almost seems odd that a contest void of all visuals and sound effects could even find shelf space in the competitive video game market. But take all these components we discussed and wrap them in the creative packaging and documentation that have quickly become an Infocom staple and you can see why this style adventure still holds some high spots on the popularity charts.



Paths of Gory

*W*ith a quick flip of the genre coin, we now enter the other side of fantasy darkness. Out of the world of pictureless, sentence-structured suicide and into the hideous horrors of high-resolution labyrinth lunacy.

Maze Games. For some reason, that title just doesn't sound intimidating. Perhaps it's the familiarity with the style that drops our defenses, as many of us were probably lured into the ranks of active video game enthusiasts by an invitation from one of the kings of the corridors in the Pac-family. There's nothing to fear, we grew up with these guys.

It might have been this false sense of security that influenced my decision to choose this route as my initiation into the role-playing realm.

Maze Master, from HesWare, was my first step into adventure gaming. The copy on the back of the box seemed to confirm my suspicions of the simplicity of my ensuing task. "The object," it said, "is for you and your party of wizards and warriors to reach Balrog's chamber deep within the labyrinth and to conquer his henchmen along the way."

Balrog!? Henchmen!? Child's play.

Within five minutes, I had skimmed the instructions, created three characters, deposited the group in the maze and run into an enraged Gladesman, who proceeded to chop the whole gang into oatmeal. End game.

It was at this point that I realized there might be more to this battle than I had originally guessed. And I am happy to report, after countless hours of militant tunnel travel, that my second assumption was correct. HesWare's maze contest is as deep in strategy and action as it is inherently elementary in design. It takes all the clever, subtle surprises and analytical puzzles that embellish the most appealing adventure games and delivers them at a very tangible, comprehensible level.

The play field is divided into three sections, whose particular itemizations will help you determine your game plan. The bottom quarter of the screen lists each of the three player representatives and some vitals based on the qualities assigned them during formation. This checkpoint monitors health and strength and should be watched carefully.

The remaining area is halved. The left side shows your position inside the maze. Your range of vision, without any help from spells or magic articles, is limited to two spaces in any direction. As you move about, the view shifts accordingly, revealing passages, doorways and a constant barrage of monsters.

The right half is akin to an electronic bulletin board. As you meander, information is posted as it becomes relevant. The messages can warn of impending dangers, give play-by-play coverage of a battle sequence, or relate some pieces of a riddle that must be solved when you face Balrog in the finale.

This design of *Maze Master* is beautifully conceived, an enthralling mix that hooked me from the start. The entangled layouts and antagonist efficiency become harder to endure as you move down the five-floor pit. The best tactic for survival becomes one of "hit and run." When you first enter the maze, your explorers have very limited power. They start with a small allotment of gold with which to buy armor and minimal knowledge of the wicked ways of the underworld. But lessons come quickly. As soon as you set foot into the first hallway, the word will go out that you've arrived. And it won't be long before Balrog organizes a welcoming committee.

Naturally, confrontations breed battles and after an exchange of swords and sorcery, the computer names Death's date for the evening. If you lose, it's back to square one for another try. But if you are victorious, you are rewarded with a random amount of gold nuggets and experience points. These can then be used to purchase advanced protection and increased strength—but only after you momentarily leave the labyrinth to tend to your wounds and tally your treasure.

So, initially, the only way to abide is to drop in on your enemies, do some quick damage and scoot to the nearest exit to cash in your purse. Then, only after you've built up some resistance, is it time to chart your way into the deeper recesses. Pa-

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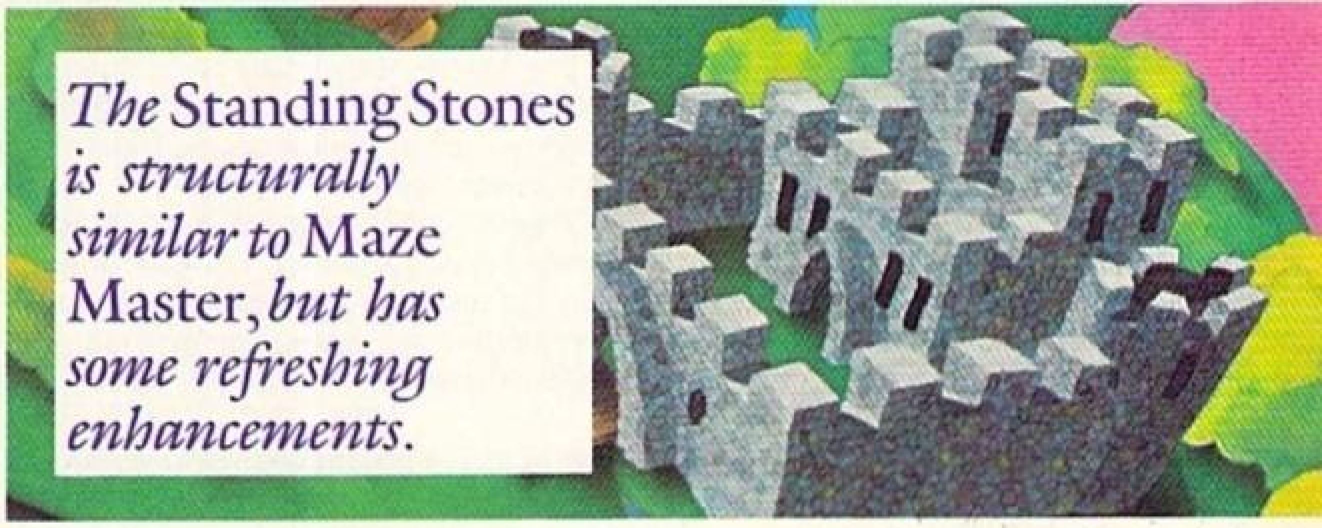


The Standing Stones *is structurally similar to* Maze Master, *but has some refreshing enhancements.*

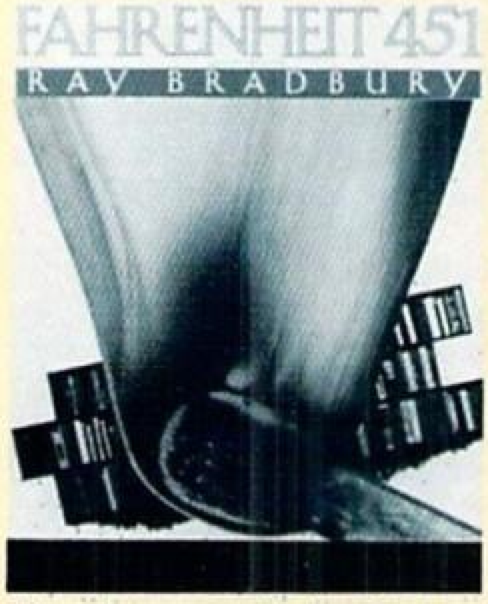
Play A Good Book

by Shay Addams

Played any good books lately? That's the theme of Spinnaker's line of "Telarium" (formerly Trillium) adventure games, most of which were adapted from novels. Other companies are doing the same thing, of course, but the Telarium project was conceived to produce a new style of adventure game, one that is closer in spirit to traditional storytelling. As Seth Godin, a Spinnaker product manager, explains: "When you're reading a good book, say a Ludlum thriller, you're really sweating because you believe you're part of the story. Adventure games weren't doing that, because the puzzles kept bringing you back to reality." Telarium's solution is to replace logical puzzles with character-oriented situations.

The Last Dragon

In Dragonworld, you must win at an arcade game in order to get money to buy equipment.



The most substantial example of this theory is found in *Dragonworld*, an adventure game based on a fantasy novel by Byron Preiss and Michael Reaves. When a frightened old hag blocks an underground tunnel, the solution is to "comfort" or "kiss" her as Amsel, the tale's friendly young hero might reasonably do. So you've still got to logically determine *how* Amsel would act in this situation. Despite Telarium's intentions, the process still involves using your brain to solve puzzles.

Dragonworld's authors also collaborated on the game, which takes up where the original book left off. Preiss, who for several years has published hardcopy "illustrated novels" of science fiction and fantasy writers, "adventurized" *Dragonworld* himself at Preiss Video Publications. He also engineered the adaptations of the Telarium books by Ray Bradbury and Arthur C. Clarke, *Fahrenheit 451* and *Rendezvous with Rama*.

The Preiss games differ significantly from standard graphic adventures. Instead of viewing a full-screen illustration of each scene, you see three panels at the top of 14 text lines. In *Dragonworld*'s first scene, Amsel, the young lad whose part you play, appears in a panel on the left. The middle box shows a sailboat on a beach and the rest of the beach appears in the third panel. When you sail off, the middle panel changes to depict Amsel sitting in the boat and an ocean view now fills both side panels. When you meet another character, his or her face occupies one box and the room or an important object in it may be shown in the middle panel. Hawkwind, ruler of the land of Simbala, is the first person you meet and proves instrumental in your quest.

The quest centers on saving the Last Dragon, whom Amsel met on a previous visit to Simbala. That tale is told in the original book and the game picks up where the novel ended. The Last Dragon gave Amsel an occult gem called the Dragonpearl. The Dragon has magically sent a message via this gem, that unknown enemies are holding him prisoner. The journey leads through the forests and jungles of Simbala and on to the rural town of Kandesh. Here you will meet other comrades and gather clues and tools. At places like the local bazaar, the three panels merge to portray a panoramic view.

In the bazaar, you discover one of three arcade-style games. With joystick or keyboard controls, you must play Dragonstones, a local gambling game. Red and blue orbs slowly fall down the screen, while you guide a cursor to hit all the

The Telarium series was conceived as a new style of adventure game—one that is closer in spirit to traditional storytelling.

stones of the correct color and win enough money to buy the necessary equipment. The second action game is a shoot-'em-up, "Bogs and Bats," but you don't need to play it to complete the adventure. In the third, "Maze of Madness," you steer a little figure up and down the ladders and around the twists and turns of the mountainous maze.

Dragonworld unfolds in a more linear fashion than typical adventures and constantly nudges you toward the next destination. From the beach, you can only cross the ocean. From that point, the path leads in but two directions. The geography expands further on, but rarely gets confusing enough to require mapping. These aspects make *Dragonworld* and the other Telarium titles easier to complete than toughies like *Zork* or *Lucifer's Realm*. Another novelty for a graphic adventure is that clues are hidden in the text, but never in the pictures.

Some of *Dragonworld's* features are shared by all the Telarium games. Sound effects and music enliven the story as the SID chip pipes out lively, polyphonic melodies when you enter certain locations. The pictures can be toggled off to speed up the game. You can save up to ten games in progress (on a separate disk) and assign each a name. This makes it easier to recall the area or situation in which the game was saved or for several family members to save games on the same disk. No points are awarded, so there's no score. You can't get hard copy of the game as it's played, but the manual lists all the words in the game's vocabulary. And if you're helplessly befuddled, encoded clues are included. When questioning characters in any of the games, you can say "talk Hawkwind" or "ask about" (a certain topic).

Got a Light?

If you run into trouble in Fahrenheit 451, just find a phone booth and ring up author Ray Bradbury.

More eloquent dialogue is permitted—and necessary for success—in *Fahrenheit 451*, which is based on Ray Bradbury's novel about a grim future in which the Fire Department enforces an oppressive government's censorship laws. Instead of extinguishing fires, the 451 Patrol burns books. Bradbury's novel ended with a fireman named Montag quitting the 451 to join the underground. The adventure game takes over at this point and your goal as Montag is to make contact with a band of rebels in New York City and liberate all the books not yet burned.

To get clues and assistance from a character, you must recite quotes from certain literary classics. A command like, "Say 'Call me Ishmael' " (from *Moby Dick*) is one such clue. But what do you do when someone refuses to cooperate until you come up with a truly obscure quote, like the last line from the "Essay on Man" by Alexander Pope?

Just call Ray Bradbury, who wrote himself into the game. Find a phone booth and ring up Ray, then say "Ask about Pope" or any other author. He'll provide the quotation you need. And if you want to chat, Ray will even reply to any statement with a sentence or two about his favorite books, likes and dislikes, and other items. This won't help you win the game, but it's an interesting way to "meet the author."

DRAGONWORLD
PREISS/REAVES

The same three-panelled graphic presentation used in *Dragonworld* is employed. Robotic hellhounds and 451 troops roam the streets at regular intervals, lending a "real-time" feel to the scenario. (You can check the time and date by typing "time.") You can also key in "remember" to review some of Montag's recollections of his former life as a Fireman. The poignant memory of his girlfriend, killed in a 451 raid, is especially touching and bolsters Telarium's effort to focus on character development. So does the constant harassment of the 451 troopers and the hellhounds. After they've killed you and ended the game a few times, you feel much more empathy with Montag's desire to thwart the 451's book-burning activities. As a result, making contact with the underground becomes more than just a game.

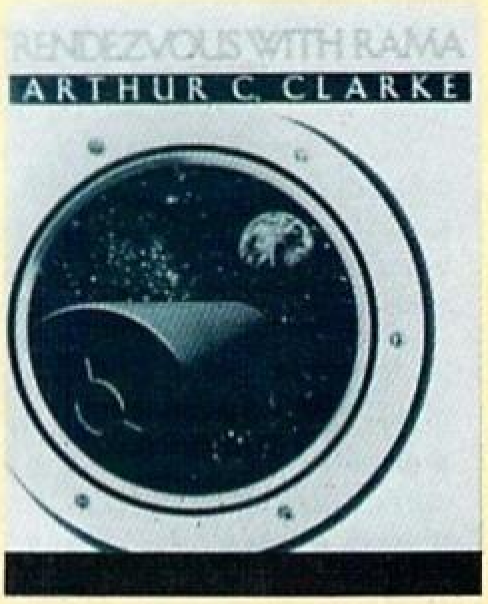
Perhaps Bradbury's contributions explain why *Fahrenheit 451* is such an absorbing story. He worked much closer with the design team than many authors whose novels have been "adventurized." Preiss says that after Bradbury devised the game's premise, "He came in and reviewed the game when it was up and running and made additional comments on the work of scriptwriter Len Neufield. He also contributed alot of the on-screen text, so much of what you actually read is written by Bradbury."

Space Rendezvous

Arthur C. Clarke lives in Sri Lanka and couldn't collaborate so closely on *Rendezvous with Rama*, based on the novel that inspired the film *2001: A Space Odyssey*. After reviewing the game once while in America, he worked with Preiss's outfit by phone and mail. Preiss recalls that Clarke once sent feedback via satellite to New York. "It was a very 'space age' collaboration," he says.

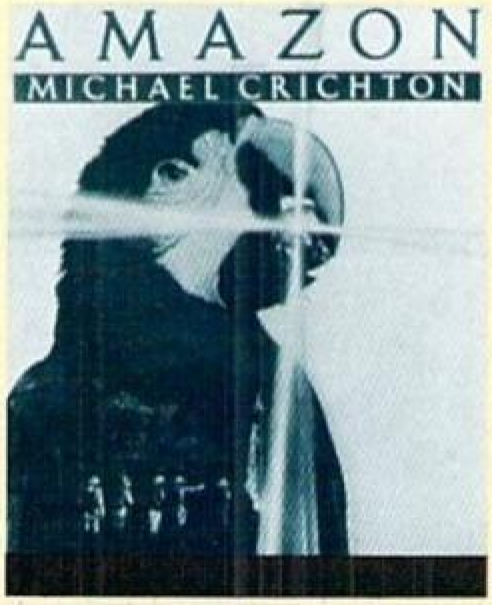
Rama is the only Telarium adventure that recreates the original novel rather than incorporating its characters in a new story. As an astronaut, you must investigate an alien "artifact" that proves to be a huge spaceship. In the book, readers could visit only the parts of the ship that Clarke designated but in the game you are free to roam about at will. That's one important difference between the experience of reading a novel and playing the interactive version.

However, *Rama's* graphics are the least attractive of the Telarium line and the story isn't as engaging as the others. Though you can communicate with the three crew members who remain on board your ship and a monkey-like android who treks along with you, there are no real character-based situations. Aside from a pair of action games, *Rama* presents nothing out of the ordinary.



Into the Jungle

Amazon moves at a fast pace reminiscent of a good action film.



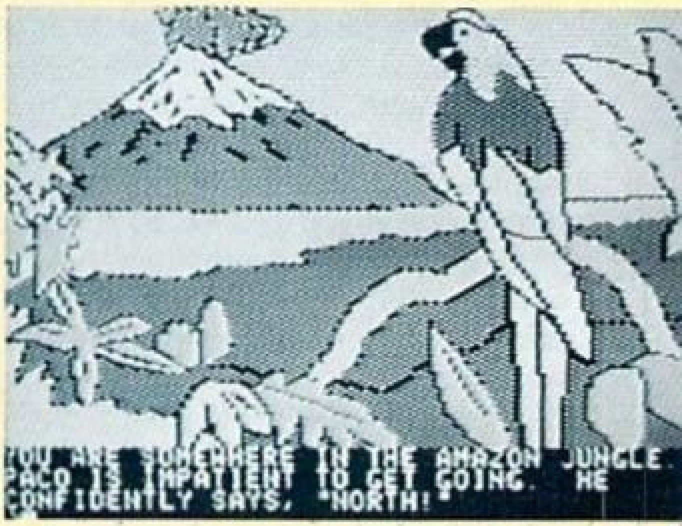
After novelist/director Michael Crichton discovered adventure games on his first home computer, he realized, "Here's a new art form, a new thing called interactive fiction-...something that's going to evolve in my lifetime. So I just jumped in and did one, the same way I did with books and movies."

He dreamed up a story called *Amazon*, then constructed a large flow chart of all the locations, text descriptions and all the program's branches. "It must have been 30 feet long," says Crichton, who wrote parts of the BASIC code himself. Then he hooked up with a programmer and an artist. He describes the actual process of creating *Amazon* as more like producing and directing a film than writing a book.

Amazon moves at a fast pace that's reminiscent of a good action film, beginning at the headquarters of a top-secret research firm, NSRT, where you view a satellite TV transmission live from a Brazilian jungle. The picture pans across a burned out camp and the dead bodies of the firm's latest expedition. From notes included in the packaging, you realize your mission is to find the lost city of Chak and its emerald mines. The gems contain rare platinum impurities that are needed in a national defense project.

There aren't many character-based situations, but you will enjoy the companionship of a wise-cracking parrot named Paco. This flamboyant bird rides your shoulder throughout the trip, offering advice and tips. More help is available from a small portable computer, which enables you to telecommunicate with headquarters for information on local natives, threatening volcanos and other dangers. When you get lost, directions can be compared with the coordinates on a map that comes with the game. For this reason, little mapping is required.

The degree of help offered by Paco and the little computer depends on which of three skill levels you select at the outset, so beginners, novices and skilled adventurers will all find this an appropriate game. With detailed, full-screen graphics, it is the best-looking of the Telarium titles. Some clues are hidden in the pictures, a few scenes are animated, and there's a pair of action games that must be won in order to complete *Amazon*.



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YOU ARE SOMEWHERE IN THE AMAZON JUNGLE.
PACO IS IMPATIENT TO GET GOING.  HE
CONFIDENTLY SAYS, "NORTH!"
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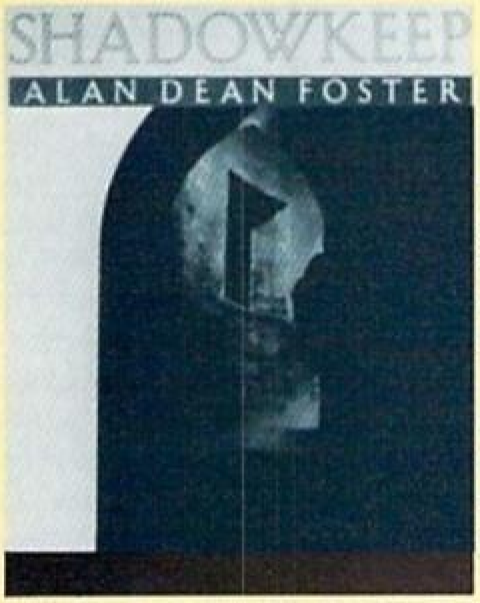
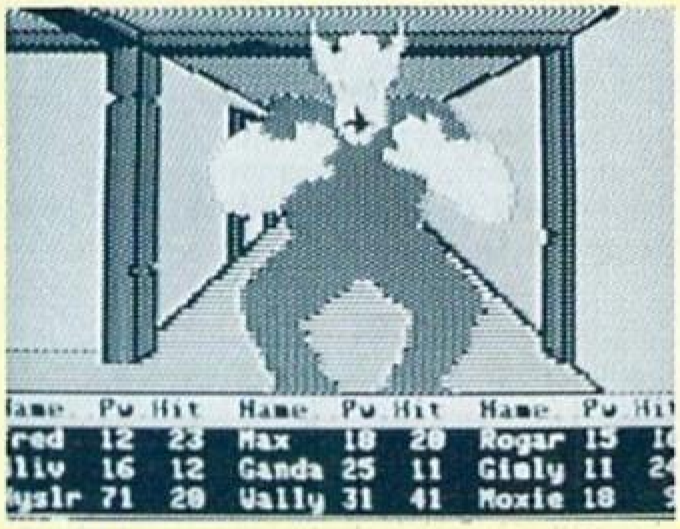
Tower of Doom



The intensity of *Amazon* is missing in the most unusual Telarium title, *Shadowkeep*, which will be available for the Commodore 64 later this summer. This is a hybrid program that combines a graphic adventure with a role-playing game. After creating up to 20 characters whose capabilities depend on the number of points you assign them for traits such as strength, power and intelligence, you send them into the dark tower called Shadowkeep in search of an evil warlock.

When confronted with snake-like Stoor Worms or any of the tower's other deadly creatures, you individually direct the actions of your band of explorers in combat. Some wield swords, others cast spells. Unlike typical role-playing games like *Ultima*, which show combat scenes from an aerial view, *Shadowkeep* portrays them with a frontal view of the enemy and animated graphics.

Another difference is that *Ultima*-style games depend on one-key commands in the combat scenes. *Shadowkeep* does utilize these but also packs a full-sentence parser and challenges you to solve puzzles while exploring the monster-ridden tower. Though the animated graphics give it a unique cinematic quality, you have to spend far too much time filling out menus in the combat phases.



```
ame  Pw Hit  Name  Pw Hit  Name  Pw Hi
red  12  23  Max   18  20  Rogar 15  1
liv  16  12  Ganda 25  11  Gimly 11  2
yslr 71  20  Vally 31  41  Moxie 18  9
```

The Parser and SAL

Designed and written by different people and companies, the final version of each game (except *Shadowkeep*) was programmed with SAL, Spinnaker's adventure-specific language and development system. The parser accepts complex sentences such as, "Give medicine to Paco," and lets you enter several commands simultaneously by separating them with a comma or "then." But if it doesn't understand your command, it responds by saying "Please try rephrasing that." This means *you'll* have to figure out where the problem lies.

The parser does its job well, but how effectively do the games achieve Spinnaker's goal of making you believe you're "part of the story?" The concept of replacing logical problems with character-based situations is sound, but it often isn't applied enough to make a dramatic difference. *Fahrenheit 451* and *Dragonworld* do deliver the feel of genuine interactive literature, of being involved with people in a compelling story rather than solving a series of logical problems. If Telarium's future games develop and expand upon the potential demonstrated by these two, perhaps the notion of "playing a good book" won't always sound so incongruous.

Shay Addams is editor of the monthly newsletter for adventure gamers, Questbuster, *and Co-author (with Dan Gutman) of* The Greatest Games: The 93 Best Computer Games of All Time. ◼

Telarium
Spinnaker Software
One Kendall Square
Cambridge, MA 02139

Ripper!

Computer: Commodore 64
Publisher: Avalon Hill
Microcomputer Games
4517 Harford Road
Baltimore, MD 21214
Medium: Disk

REVIEWED BY GORDON OWENS

In the year 1888, the Whitechapel area of London, England, was terrorized by a series of five brutal murders, all of which took place between August 31st and November 9th. The murderer was never apprehended despite the efforts of Scotland Yard, citizen patrols and bloodhounds. As suddenly as they began, and for no apparent reason, the killings stopped.

Scotland Yard, for some unknown reason, found it necessary to deny the public access to the file on the case until the year 1992. As a result, these crimes have remained infamous through the years, with experts and amateurs alike speculating on the case. The murders have remained in the limelight mainly for two reasons: first, despite great effort, the case was never solved and the murderer never caught, and second, the murderer became extremely well known because of the terrifying name he signed to letters sent to the police.

Today, few people are familiar with the Whitechapel murders, but everyone has heard of that depraved monster Jack the Ripper. Now thanks to Avalon Hill Microcomputer Games, you and your Commodore 64 can confront and put an end to the dark and evil works of Jack the Ripper in the mystery adventure game *Ripper!*

Ripper! is set in the year 1900, 12 years after the original crimes took place. Once again the Ripper begins his reign of terror. Since you are the one who brought the Ripper's plans to an end the first time, Scotland Yard has assigned you to the case. To help you, some of the most famous celebrities of the late Victorian era have gathered at Hampstead Manor. You must be cautious though, for Scotland Yard has learned that by his insane ingenuity, the Ripper has intercepted one of the invitations and stalks Hampstead Manor itself. He may even be disguised as one of the guests.

> *Scotland Yard has assigned you to solve the case. You must be cautious, though, for the Ripper may be right there in Hampstead Manor.*

Although *Ripper!* is not historical, many of the guests at the manor *are* historical characters. With this in mind, playing *Ripper!* proves to be a bit of an education as well.

The game itself comes packaged in a neat book-sized box which makes for easy storage when not in use. The documentation supplied with the game is in the form of a five-page foldout pamphlet. This pamphlet covers information about loading the game, basic playing hints and strategies, command format, game save and trouble shooting.

Ripper! is a disk-based text adventure game with audio-visual enhancements. Typical of most adventure games is the method used to move about the manor. To go North, you enter North or its abbreviation. This works the same with all of the other compass points.

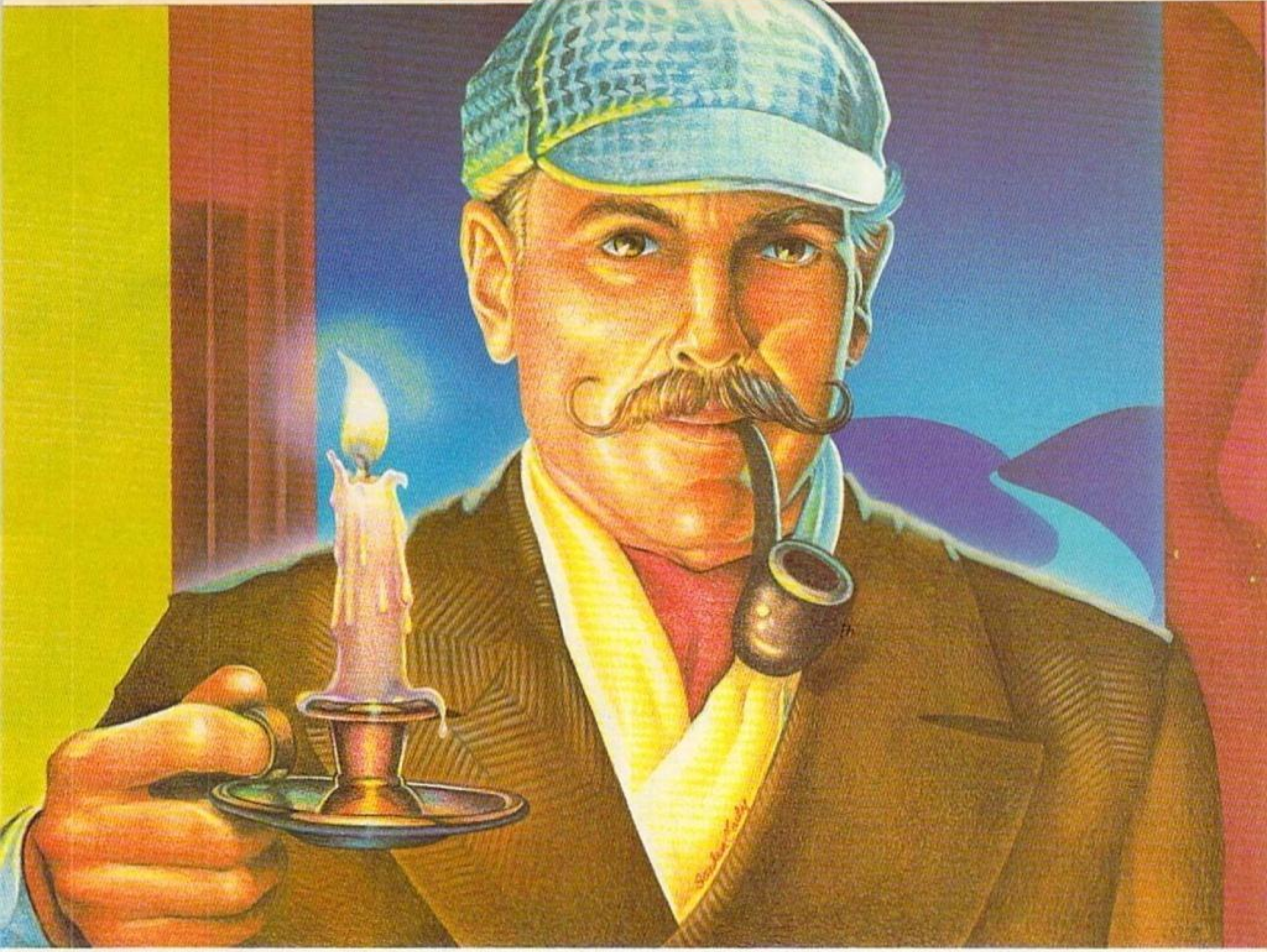
The game also comes supplied with a rapid-move command. This comes in very handy once you are familiar with the layout of Hampstead Manor. For example: if you want to move North five times, you would type N five times separating each letter with a semicolon. If you run into a wall or attempt a direction that you cannot move, the rapid-move command will abort. If you make a mistake when entering a command, the INST/DEL key will allow you to backup and re-enter the command. All in all, the instructions don't give you a great deal of information regarding the commands the game will or will not accept. My recommendation is that you experiment.

In playing *Ripper!*, there is always the possibility that the Ripper will find you before you find him and if he does, you know what that means. When you first play the game, you stand a good chance of suffering such an untimely death, though the odds of being killed are not as great as the instructions lead you to believe. Another nice feature is the ability to save a game in progress to the disk. However, the save feature can only be used a maximum of three times for any given game, so you had better use your saves wisely. To restore a saved game, all you have to do is hit the RESTORE key.

Ripper!, although strictly a text adventure game, does contain some excellent audio-visual enhancements. Throughout the game, the computer generates music as you play and when you move or execute a command, you hear a bell tone which lets you know that your command was received. Also, when you find a clue or solve a puzzle, the computer plays a short trumpet-like tune, which serves to let you know you are getting somewhere. The music that is played throughout the game is used to provide some tension. One example: As you explore Hampstead Manor you will encounter a cobra and when the cobra prepares to strike, the music increases in both pitch and tempo. I've found this feature to be quite effective and very well done.

Ripper! also includes some nice visual enhancements. These include an Old English character set, scroll work at the top of the screen, and a small skull preceding some of the statements that appear on the screen. One effect that I find makes the game very realistic shows up when you use a candle. When the candle is about to go out, the screen begins to flicker and then, when the candle does go out, the screen blacks out too. This same effect is used when the lights in the manor go out. While these features are not necessary to game play, I've found they round out the game quite nicely.

When *Ripper!* finishes loading, the game credits appear on a screen with a black background, in Old English text, one at time, which is reminiscent of the method used in old-time horror movies. The credits are accom-



panied by eerie music that plays throughout the rest of the game. At first I found the music to be quite nice, but after awhile it did tend to get on my nerves and I was tempted to turn it off. This is something you don't want to do, because the music and sound effects are an important part of the game and atmosphere.

After the title screen, the computer asks you if you would like to see the prologue. If you answer yes, then the computer will tell you of events up until that time. If not, then the computer will take you directly into the game. When the game starts, you are standing in the entranceway to Hampstead Manor. Going North from here leads you farther into the manor and closer to your goal: to stop the Ripper. You can go outside to the street that runs in front of the manor, but this is of no benefit and plays no part in the game.

I've found that when you first play the game, it is best if you use this time to explore the manor and become familiar with the guests that are staying there. It is these guests that you depend upon to help bring the Ripper to bay. Your chances of success will increase substantially if you can correctly identify each guest and discover how their special skill can help you in solving the mystery, although identifying the guests is not a prerequisite to the successful completion of the game.

When you first begin exploring the manor, it's necessary to draw a map, as this will help you find your way around the manor and becomes invaluable when using the rapid-move feature. As you explore the manor, it may seem at first like you're not getting anywhere. But you'll find that as you continue, things begin to fall into place.

A point worth mentioning: You don't actually capture or kill the Ripper. I found this to be somewhat confusing, because the instructions speak of the capture of the Ripper. Avalon Hill has informed me of their intent to design another game that will take up where this one leaves off.

Last, but not least, to prevent getting hopelessly stuck in the game, my first recommendation is that you try playing with a group of friends, because this makes it more likely that someone will hit upon a solution. Second, use the sealed envelope with clue sheets inside, though I suggest this as a last resort.

Ripper! is rated a six in complexity on a scale from one to ten, thus making it ideal for the beginning to intermediate adventurer. Despite a minor problem of slowness, I feel *Ripper!* would certainly make a worthy addition to your program library. C

Word games have been popular computer fare since the invention of the microprocessor. Now these diversions boast high-quality graphics and mind-testing skill challenges to make them better—and more fun—than ever.

BY JOYCE WORLEY

Word Challenge

Its publisher bills *Word Challenge* (Hayden Software, 600 Suffolk Street, Lowell, MA 01854/disk) as "the ultimate word game." That's not an idle boast. In this Boggle-style contest, players race against time to find words hidden within a grid of letters. A letter can be used only once in any word and all letters in a word must be sequentially adjacent on the grid.

Word Challenge is best as a two-player contest, but if you don't have a human opponent handy, a character named LEX provides computer-generated competition.

Valid words must contain at least three letters. Longer words are worth more than shorter ones. The computer maintains a running score for all players and checks all entries against a built-in 90,000-word dictionary.

A wealth of options can tailor *Word Challenge* to suit every taste. LEX can play at 26 skill levels. He finds all possible words at the highest skill setting, while the lowest is suitable even for a child.

The participants can vary the size of the grid to control the length of the play session. Novices are advised to start with a 3x3 set-up and advance to 4x4 and 5x5 after a few games. It's even possible to rotate the board during play to get a new view of the letters.

A unique feature is the embedded-word option. This gives players credit for short words contained within larger ones. For example, in the standard game, a player gets credit for "strainers." Yet this word also includes "train," "rain" and others.

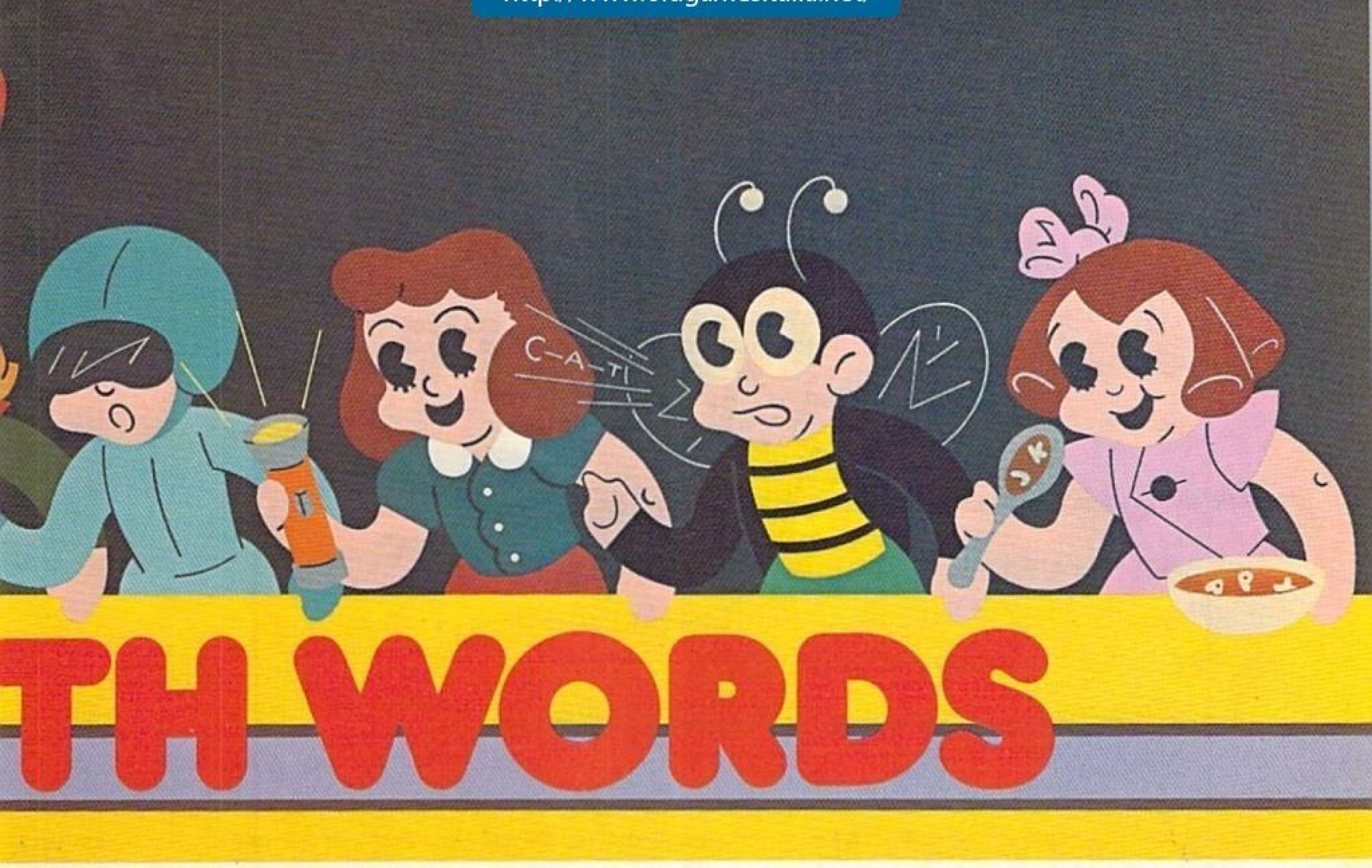
The suffix option gives credit for all embedded words beginning with the same three-letter sequence as the original. Similarly, by choosing the "all" option, the player gets credit for all words contained in the original. This saves a lot of typing.

Every parameter of the game can be altered, including the time limit, number of points needed to win and the scoring system. Five possible scoring methods give varying points for different word lengths.

In the standard version, LEX vies with the gamer to find words in the grid, while the scorekeeper searches its memory banks to locate every possible combination. The scorekeeper compares the players' word lists and awards points. Any words not included in the game's dictionary are then presented for human approval.

M-ss-ng L-nks

Some word games are designed to be educational, but transcend their origins in highly entertaining fashion. *M-ss-ng L-nks* (Sunburst, 39 Wash-



JULIA KING

ington Avenue, Pleasantville, NY 10570/disk) is a case in point. Its educational value doesn't keep it from being fun to play.

The player chooses a passage from one of nine classics of literature, like *My Side of the Mountain* or *Wind in the Willows*. The computer prints the text on screen, with key letters omitted, and the player must fill in all the blanks to win.

The number of blanks depends on which of the nine difficulty levels the user selects. At its simplest, the program omits all vowels from the onscreen words. Other settings instruct the computer to print only every other letter, the first letter of each word, every other word, only the vowels, the last letter of each word, the first word of each sentence, or only blanks for the letters. The final, most difficult setting is a stumper that requires great memory and concentration: There's no text at all! *M-ss-ng L-nks* provides over 500 different puzzles for solitaire word play. And you might even learn a little about some excellent books. The same publisher is reportedly readying a whole line of programs in this series dealing with other subjects.

Wordrace

Wordrace (Tronix, 8295 South Cienega Blvd., Inglewood, CA 90301/disk), for one to four participants, exercises vocabulary in a time-clocked sprint to define words.

As the on-screen timer counts down from 600, each gamer tries to choose the right definition from a list of six possibilities. A right answer wins the number of points left on the clock. An incorrect choice costs the player an equal number of points, so this is the one test where it pays to take a little extra thinking time.

At the beginner's level, the words are suitable for kids age nine to 14. Intermediate *Wordrace* is best for family/social play and regular *Wordrace* tests college students and others who take pride in their large vocabularies.

The disk includes three additional programs. Challenge *Wordrace* features obscure English words that might stump Mr. Webster himself. Claim to Fame and Sports Derby are trivia contests, which test the player's ability to recognize famous people. In both, the screen displays the name of a famous person with six possible identifications. As in the standard version of *Wordrace*, the object is to pick the right choice before the clock reaches zero.

There are 2,500 words in *Wordrace* and 1,200 names in Claim to Fame and Sports Derby, so computerists won't use up this mind-teaser in an afternoon.

Webster: The Word Game

CBS Software (One Fawcett Place, Greenwich, CT 06836) combines action graphics with word fun in *Webster: The Word Game*. It's primarily designed for grammar school-age kids, but older children and parents can also have a good time.

A word missing key letters starts at the top of the screen and gradually descends. Using joystick or keyboard, the player moves an animated hand across an alphabet at the bottom of the display to select the letters which complete the word.

When the gamer enters a correct letter, the word moves one notch back toward the top of the screen to give some extra playing time. The object is to complete the word before it hits bottom. Failure costs the player one hand. The game ends when five hands are lost.

Webster: The Word Game has seven skill levels. One or two players select independent difficulty settings, so adults and children can compete even if there's a vocabulary gap between them.

"Demon words" pop up randomly to make play more exciting. These toughies move down the screen extra fast, so they call for a good knowledge of words along with excellent speed.

The top skill setting, the challenge level, has only demon words. If the player gets ten of these right, a hidden code word is revealed on the screen as a reward for an outstanding job.

The primitive word-search routines that amused basement hackers in microcomputer's dawn seem pathetically simple by current software standards.

Up for Grabs

Up for Grabs (Spinnaker Software, One Kendall Square, Cambridge, MA 02139/disk) is a competition for one to four players, age eight to adult. An alphabet cube spins on the screen, with three letters visible at all times. These change constantly. Players use the joystick to stop the cube's rotation and grab letters to form words. If two or more players try for the same letter, the race is won by the first one to align a pointer with the letter and push the action button.

The player then positions the letter on a playing area. Once placed, it can't be moved, though it can be discarded altogether at the end of each quarter. The goal is to form words using these captured letters. The score depends on the point value of the letters and where the word is located on the play field.

Up for Grabs works well with one, but is even better with a little competition. The letter-grabbing sequence gets pretty exciting when several players try for the best ones at the same time.

Up for Grabs has four skill levels. At the simplest setting, there are 120 letters presented in each game and the cube rotates very slowly. At the expert level, there are 360 letters and the cube spins rapidly, making this a tough challenge even for experienced gamers.

Wordfinder

Wordfinder (CBS Software, One Fawcett Place, Greenwich, CT 06836/disk) is another program intended for educational use, but its play value makes it a sure bet. One or two players agree on a time limit and then search for words hidden within one of 24 key-words.

Words must contain at least three letters. A built-in dictionary checks all entries and tosses out colloquialisms, slang, profanity and proper names.

Each player enters a word in turn. If the program rejects any word, it flashes a message to inform the offender. About two-thirds of the acceptable words earn bonus points for a player who can pick the correct definition from four choices.

The game ends when no player has a word left to propose. If desired, *Wordfinder* then displays a full list of embedded words. Gamers who want to expand their vocabularies can get definitions of any words with which they're unfamiliar.

Wordfinder is a great vocabulary builder for kids or adults. More importantly, it's probably the best embedded-word game created to date, whether played competitively by two or solitaire by one.

Pathwords

Pathwords (CBS Software, One Fawcett Place, Greenwich, CT 06836/disk) adds a strategic element to a grid-search. The screen shows one to four participants a randomly generated grid of 109 letters and challenges them to construct words by connecting adjacent letters. The longest words score the most points.

One- and two-player games end when both have compiled lists of ten words. When three or four compete, the contest terminates when everyone has a list of five words.

Gamers set the time limit for forming each word, then use a joystick to maneuver a cursor over the diamond-shaped matrix of letters. At the start of each player's turn, the mandatory first letter flashes on the grid. Each letter in a word must be adjacent to the previous one.

Thinking ahead is crucial, since the last letter of a player's word remains on the grid in the same position and becomes the first letter in that person's next turn. It's smart to end a word with a letter in the heart of the

REVIEWED BY BRUCE JAEGER

Monty Plays Scrabble

Computer: Commodore 64
Publisher: Epyx
1043 Kiel Court
Sunnyvale, CA 94089
Medium: Disk

I don't think I have to begin by describing Scrabble. *Everybody* knows how to play Selchow & Righter's famous crossword game. If you don't know how to play Scrabble, you probably also don't know how to play Monopoly and don't know that a full house beats a pair. But you probably really don't care anyway, because you're only making a brief stopover here on your way from Alpha Centauri to Tau Ceti IV.

Until recently, Scrabble has resisted computerization, at least on personal computers. Unlike chess, which can be programmed to play legally (though not necessarily very intelligently) just by following a few simple rules, a Scrabble-playing program, by its nature, requires a large vocabulary. Before the relatively recent plummet in memory chip prices, Scrabble as a computer game just wasn't practical.

I know, I tried it. Way, way back in personal computing's ancient history—about six years ago—I began working on a Scrabble program with my 8K Commodore PET and 2040 dual disk drive. I planned, in my innocence, to have the game's vocabulary on disk and make the BASIC program go through the entire vocabulary each move. If I had stuck it out and finished a working version, you could have made your move, then gone out for a pizza, several beers and a movie matrix rather than on its edge. That way, there are more possible candidates for the second letter of the next round's word. It's also a good idea to end a word with a letter that makes it easy to start the next word.

When there are several players, words can be challenged. It's a good idea, with this version, to keep a sizeable dictionary at hand to settle disputes. If the word is unacceptable, challengers gain points and the player loses a turn. Incorrect queries lose points.

Chatterbee

Chatterbee (Tronix, 8295 South Cienega Blvd., Inglewood, CA 90301/disk) is a spelling tutorial that is also a reasonably pleasant game. Much of the enjoyment springs from the program's excellent speech synthesis, which allows it to speak aloud the words to be spelled.

As the speller types each letter of the word, *Chatterbee* pronounces it. The 2,500 words included are divided into 25 levels of 100 words each. There are three lists—easy, medium and difficult—for each of the first six grades of school and one for each upper grade level. The hardest setting could beat anyone.

Chatterbee speaks a word aloud, uses it in a sentence and then says it again, just as in a typical spelling contest. A correct spelling produces hearty congratulations from the vociferous computer. If the player can't get it right in three tries, *Chatterbee* spells it and goes on to the next word. Although definitely an educational

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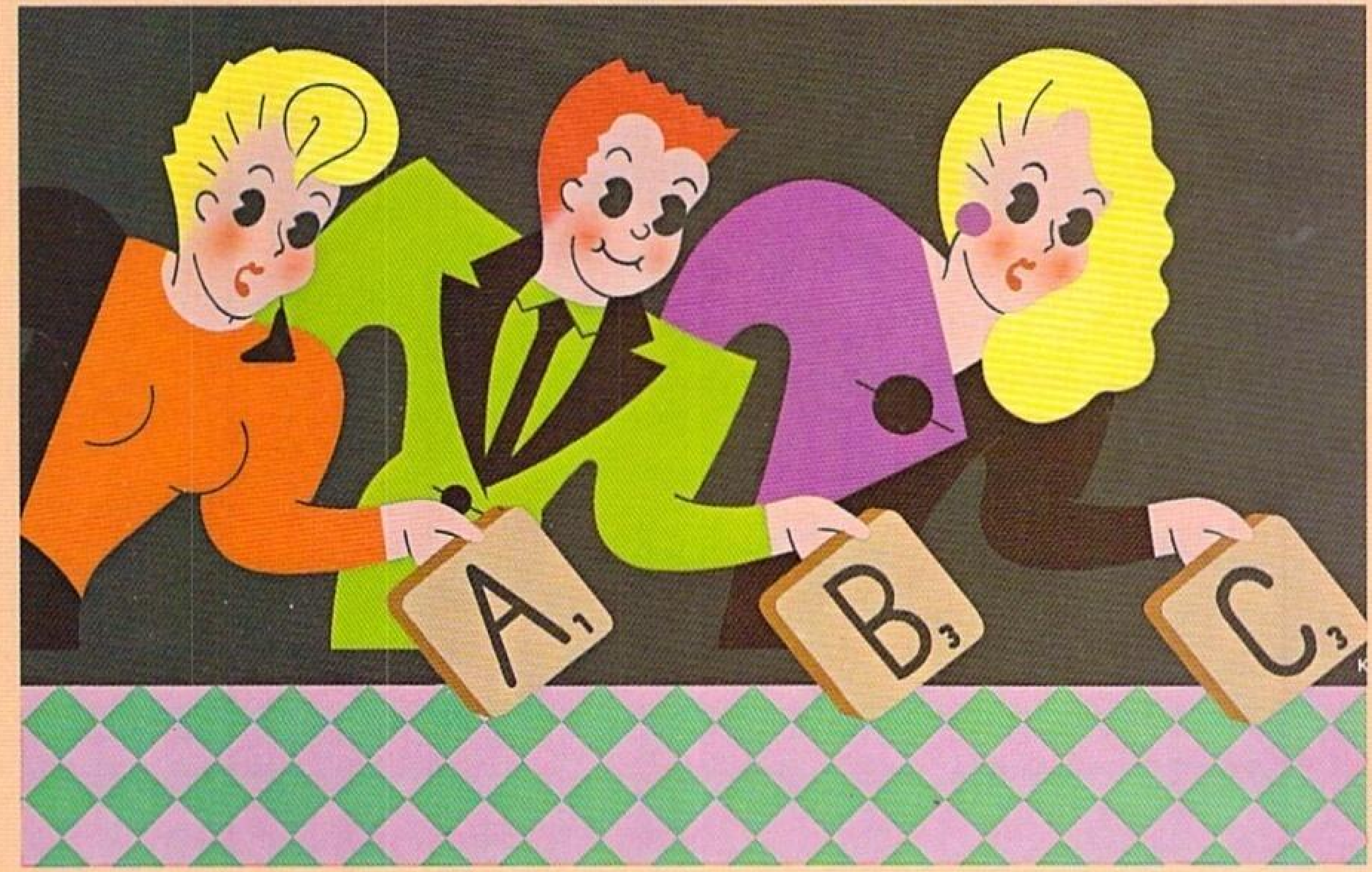

JULIA KING

while the computer chose its word.

That's why I'm so impressed with *Monty Plays Scrabble*. The programmers out at Leisure Genius who designed it are to be commended for *Monty's* speed and intelligence. It plays a solid, respectable game of Scrabble.

The directions accompanying *Monty* include the complete, official Scrabble rules (the game is licensed by Selchow & Righter). There are also some loading directions and three pages of instructions for playing against *Monty*.

I had some problems loading the program. While my over-worked and under-adjusted disk drive has to share some of the blame, I lay most of it at the feet of the anti-piracy protection scheme used. The loader program "MONTY" loads four program files, "MON1," "MON2," "MON3," and "MON4." These files, when decoded, then load the bulk of *Monty* from random-access files on the disk. The loading would often "hang up" at this stage with the disk drive spinning aimlessly until the system was shut down.

Here's a trick that works for me: After the disk spins long enough for you to know you've got a bad load, try opening and closing the disk drive door *while the drive is spinning*. Of course, this isn't a recommended practice, but it works. Chances are, of course, that *your* program will load faultlessly every time.

Once *Monty* is up and running, you're asked several questions concerning the many playing options *Monty* offers. The first, and most important, is your computer opponent's skill level, anywhere from one (least skillful, but fastest) to four (toughest opponent, but a game can last two hours).

The program then asks for players' names. You may play with up to four players and any of them may be computer players. You can even specify different skill levels for different computer opponents. The remaining questions, in order, are:

1. Are you using a color television?

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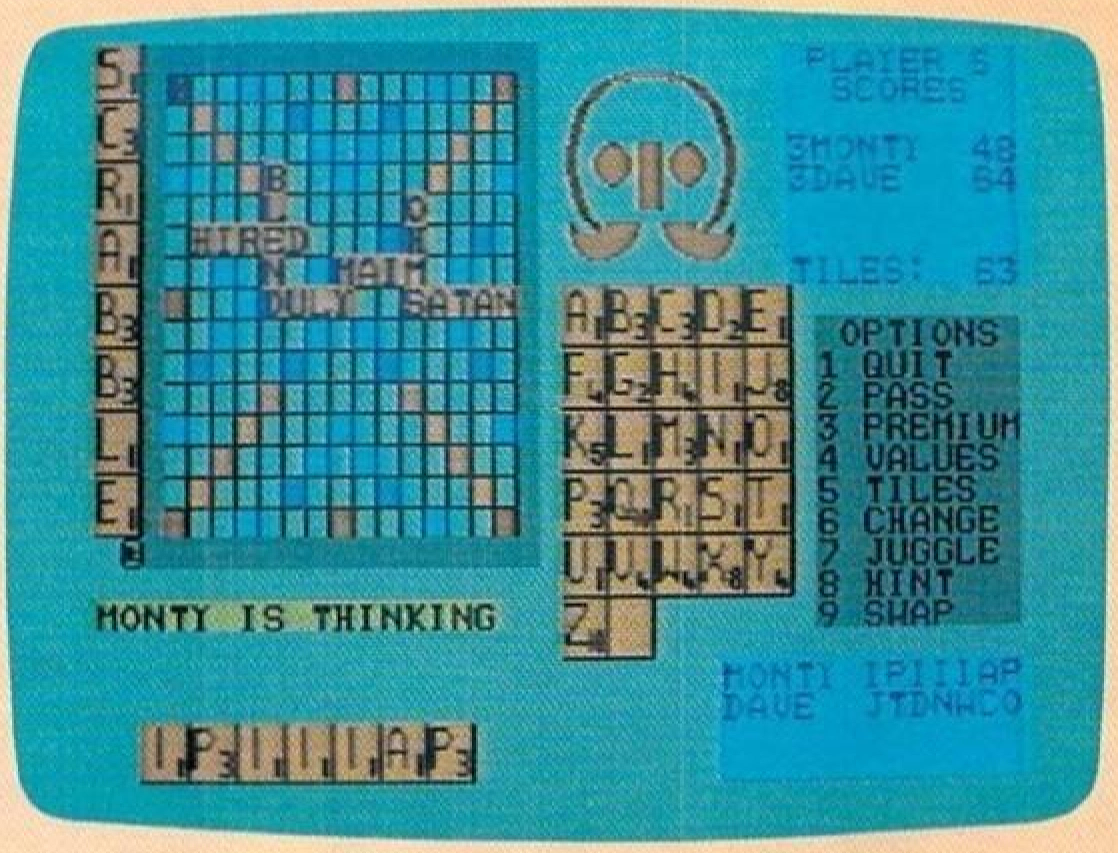


Monty tries different words until the one with the most points is found.

A Scrabble board uses different color squares for double letter score, triple word score, etc. *Monty* will duplicate these colors if you're using a color screen, or use special symbols if you're playing on a monochrome monitor. This is a thoughtful addition; many programmers *assume* you're using a color monitor and leave the numerous black-and-white users trying to decipher various shades of gray.

2. Do you want to watch me thinking?

You can actually watch *Monty* try different words until the one with the most points is found. While interesting at first, I found that it tended to slow down *Monty's* thinking too much. I'm glad they made this an option.

3. Do you want to see all the racks?

This is most useful if you're playing with other persons. When you're done with a turn, it erases the display of your rack of letters and pauses to let the next person play, giving the first player time to leave or avert his eyes. Only expert, show-them-no-quarter players would benefit much from seeing another player's letters.

4. Do you want sound effects?

Gives you a chance to turn off the sound prompts if you wish.

5. Are you using a Scrabble board?

You and your friends may play around an actual Scrabble board and just tell *Monty* what tiles have been drawn and what words have been played.

6. Speed of word placement. (0-9)

You can either watch *Monty* plunk his (and your) words down slowly, a letter at a time, or whiz through them.

7. If you're playing with a Scrabble board, *Monty* will ask you to draw titles to select the first player. If you're not, *Monty* will assign the starting player at random.

Once all the preliminaries are taken care of, *Monty's* playing screen comes up. High-resolution graphics and customized characters are used to good effect, making a very readable Scrabble board and rack of letters. Besides the board itself, the screen has a reminder list of available options:

1. QUIT: Lets you quit *Monty*.
2. PASS: If you cannot make a word, choosing this option passes the turn to the next player.
3. PREMIUM: Displays Scrabble's premium square scores and colors.
4. VALUES: Gives the point value of each letter.
5. TILES: Shows how many tiles of each letter are used in the Scrabble set.
6. CHANGE: Lets you exchange some or all of the letters in your rack for new letters. Costs one turn.
7. JUGGLE: Changes the order of the letters in your rack; this helps you to see possible words.
8. HINT: *Monty* will suggest a playable word for you in case you get stuck.
9. SWAP: Lets you and your computer opponent swap racks. If *Monty* is killing you because you've been drawing some real cheeseburger letters, this way you can make *him* play them!

Choosing and placing your words is straightforward. *Monty* won't let you place a word if you don't have the required letters. But, because *Monty's* built-in vocabulary is limited to 12,000 words, *Monty* will never challenge any of the words you play. You're on your honor; if you want to play "XJZQWH" as a word, *Monty* won't stop you.

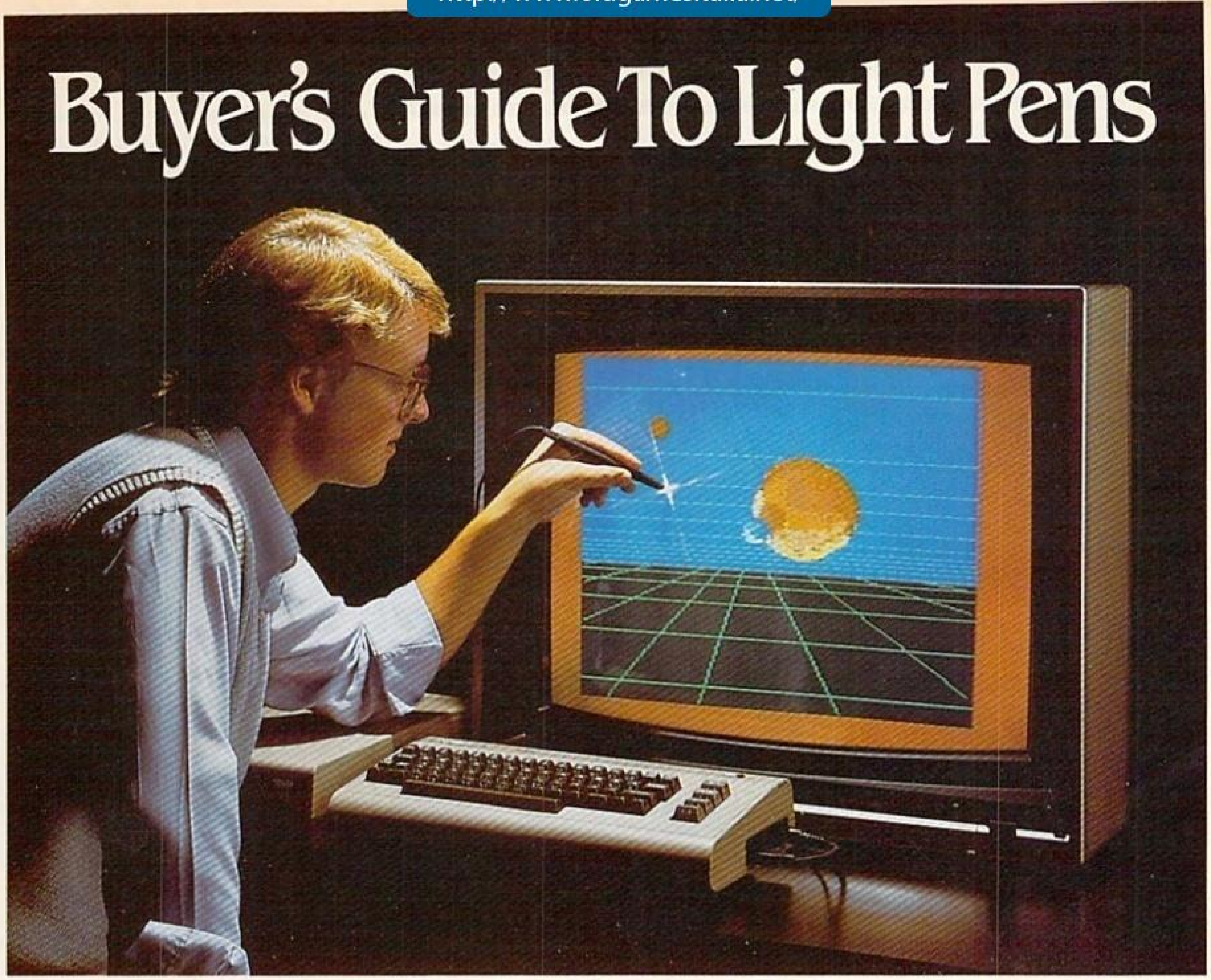
But if you play fair, *Monty* can be a formidable opponent. Not at level one (that's kid stuff), but at level four. At first, I was inclined to criticize *Monty's* speed of playing (from one to six minutes per move at level four) until I realized that *I* was taking *at least* as long for my own moves. *Monty's* designers managed to cram that 12,000 word vocabulary into memory all at once, so the program isn't slowed by having to get information from the disk.

And don't think that *Monty* just plays words like "cat" and "dog" and "do," "re," "me." It smashed me with obscure words like "qua," "yeti" and "soling." And while it hasn't hit me yet with any of the famous Scrabble words like "henequen" or "cazique," I wouldn't be too surprised if it did. *Monty* is capable of interlocking its words pretty tightly.

Oh sure, I have a few gripes about *Monty*. Sometimes it doesn't seem to think defensively, leaving me a chance at a wide-open triple word score. And occasionally, the "hint" option has returned a word that I didn't have the letters to play. When choosing options, *Monty* is sometimes confused if you don't type *exactly* what it wants to see. (The best thing to do here is not type ahead, but wait for its prompts before pressing any keys.) And as I mentioned previously, the entire program may be difficult to load if your equipment is abused and battered like mine.

What I like best about *Monty Plays Scrabble* is that I win half the time and *Monty* wins half the time. That, to me, is the essence of a good computer game. ■

Buyer's Guide To Light Pens



BY LOUIS R. WALLACE

To effectively use your computer, you must communicate with it. The most common method of communication is, of course, the keyboard. But the keyboard is not necessarily best for every purpose. To fill other needs, additional devices have been developed: joysticks, paddles, touch tablets, mice and specialized keyboards. Perhaps the most fascinating is the light pen.

A light pen makes computer graphics easy. Here's a buyer's guide to help you choose the one that's best for you.

Programming with a Light Pen

The Commodore 64 uses electron beam scanning, which is how the picture on your screen is created and maintained. The electron gun in your television or monitor projects a beam of electrons at the screen, starting at the upper left corner and going in a straight line to the right corner. Then it jumps back to the left, drops down one scan line and moves in a straight line to the right again. It does this over 200 times, one for each scan line on your monitor. In this way, it draws the picture. It then jumps back to the upper left corner again and starts over. And you may be surprised to know that it does all of this 60 times a second.

When your light pen is close to the screen, it can detect when the electron beam strikes it and sends information about the X and Y position of the pen back to the computer. Memory location 53267 ($D013) is the register that will contain the X location and 53268 ($D014) is the Y location. To read them, have your light pen in joystick port 1 (front) and peek the values in those locations when the pen is close to the screen. For example, to read them from your own program you would write something like this:

```
1000 X=PEEK(53267):
     Y=PEEK(53268)
```

The variables X and Y will now contain information about the relative position of the pen on the screen. In order to use it precisely, you must calibrate it by printing something on the screen at a known location (perhaps a sprite or a high-resolution point). Pointing the light pen to this object, you can read the light pen registers. By comparing these values with the known position of the screen object, you can calculate the amount you must add or subtract to your X and Y variables. This will allow you to use the light pen in your programs to

Buyer's Guide To Light Pens

control sprites, make menu selections, or even draw pictures.

It will also work in all graphic modes, as long as the screen is bright enough to trigger the pen. In other words, black screens cannot be read by the light pen. Depending on your monitor, some other dark colors may not work well, either.

Light Pen Packages

Luckily, if you are not interested in programming, there are quite a few commercial software packages that use the light pen's capabilities. Some of these programs accompany the light pens when you purchase them and some are bought separately. They are all basically graphic packages that can be used for drafting, painting or drawing and are as powerful as mainframe graphics of a few years ago.

The graphics packages are of two types. In standard high-resolution mode, you have a resolution of 320 X 200 pixels. However, this resolution has its cost in color, in that you will find using color difficult. The most common package is multicolor, where you use the 64's multicolor high-resolution mode. This has the advantage of being able to have more colors used in your drawing. The disadvantage is that you have a lower resolution in the X (horizontal) dimension. In multicolor mode, your pixel resolution is 160 X 200 pixels. Multicolor high-resolution packages are best suited to painting, illustrations or LOGO screens, while standard high-resolution is more useful for drafting or design work.

Tech Sketch

Tech Sketch, Inc. makes two light pens for the Commodore 64. The LP-10 ($39.95) is a sleek high-resolution pen with a push button on the barrel. It is just about the size of a medium pencil and fits very well in either an adult's or a child's hand. I found it to be sensitive and easy to handle. Tech Sketch also makes the LP-15 ($89.95), which is a slightly larger but much more sensitive light pen. Both will work in high-resolution, but the LP-15 is suited best to those who need more precision.

Included with either pen is a copy of the *Micro Illustrator* graphics program, a high-resolution multicolor drawing/painting package. The program begins with a menu of options, which is very similar to the Koala Pad touch tablet's graphics package. You can choose to draw with a variety of brushes, make geometric shapes, fill with colors and patterns, store and recall from disk, and print your picture on a number of different printers. You may add text to a picture or zoom in on a section of screen for pixel-level editing. You can even copy a section of screen to another position. And more importantly, you have good control over exactly what you are drawing. The *Micro Illustrator* is a very good graphics painting program. Used with the Tech Sketch light pens, it creates a powerful package.

> *Light pen graphics packages can be used for drafting, painting or drawing and are as powerful as mainframe graphics of a few years ago.*

Koala

Koala Technologies, maker of the Koala Pad touch tablet, also has a 64 light pen package. The Koala Light Pen System ($99.95) includes software with the light pen. The light pen is about the same diameter as Tech Sketch's LP-10, but is more tapered so it has a sleeker appearance. It does not have a regular button, but has a push-activated tip, which is triggered when you press the pen against the screen. The software is called *KoalaPainter* and is virtually the same multicolor painting/drawing package that comes with the Koala touch tablet. Pictures drawn with one Koala system are loadable by the other—a definite plus if you already own a Koala tablet.

The functions available on the *KoalaPainter* are also comparable to *Micro Illustrator*, except that there is no provision for printing your picture from the program itself. You can get several public domain programs (from your local users group) that will print Koala pictures. I did find, however, that the pen was not quite as stable as the Tech Sketch LP-15, but was about equal to the LP-10.

Baudville

Baudville has recently released a new multicolor graphics package called *Blazing Paddles* ($34.95). This program can use several different methods of drawing, including light pens, joystick, trackball, touch tablet and paddles. While it did not include a light pen, I found that all the pens I had worked fine. *Blazing Paddles* contains the usual assortment of box, circle, line and brush options, along with disk storage and a printer dump. You can fill with both solid colors and patterns. It also has an "air-brush" drawing option, which gives a spray effect when drawing. You also have a choice of several typefaces for text. Finally, it has a shape option. This is a series of pre-drawn shapes on file (cars, faces, hands) to use in your own design. If you are interested in combining the effect of several different devices in your pictures, *Blazing Paddles* may be just for you.

Madison Computer

Madison Computer makes a light pen for the 64 called McPen ($49.95). The McPen is a very good light pen, able to detect accurately its position on the screen with a minimum of jitter. It has its own stand when not in use and has a sensitivity adjustment on the base of the stand which allows you to fine tune it to your monitor or television.

Included with the pen is a disk with several programs on it. It has Tic-Tac-Toe, a file-copying utility and a demo program that shows you how to program a sprite to follow the pen. The McPen is a quality instrument and works well with most light pen graphic programs.

Blazing Paddles *graphics software can be used with a light pen, joystick, trackball, touch tablet or paddles.*

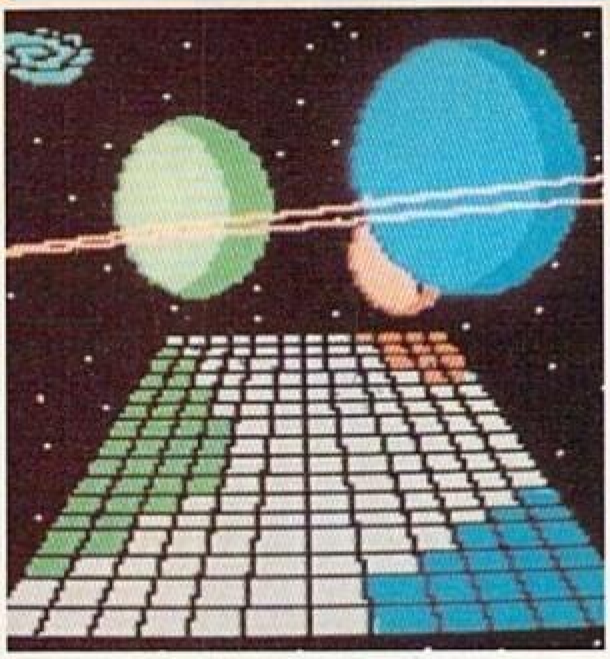
Abacus

Abacus Software markets *Cadpak-64* ($49.95), a high-resolution drawing package for serious applications. This program does not come with a light pen, but recommends McPen or some other high-quality pen. It provides all the standard options such as circles, boxes, ovals, lines and text. It also gives a grid to aid in positioning the pen for precise drawing. You can fill (solid and pattern), copy from one area to another, and expand or rotate an image in memory. You can even use a special turtle-graphics editor to create shapes, which can be added to your drawing. You can also add color to your picture, but you must keep in mind the color limitations of the 64's standard high-resolution graphics.

Cadpak supports a number of dot matrix printers and will give you a choice of two sizes of hard copy. I found *Cadpak* a little difficult to get used to, but once I became familiar with it, I could draw quite complex images with very little trouble.

Inkwell Systems

And finally, Inkwell Systems markets *Flexidraw* ($149.95) a high-resolution graphics system complete with a high quality light pen. *Flexidraw* may be the best drawing/drafting system available to the serious 64 light pen user, which makes its high price a little easier to understand. The pen is activated by pressing the tip to the screen and gives as precise a reading of position as any pen tested. It is very similar in shape to the Koala light pen, but is a better quality instrument. While I was able to use the Flexidraw light pen with other software packages, only the Flexidraw pen will work with its own graphics package.



I tested version 4.0 of the *Flexidraw* software and it is a true high-resolution graphics system, just as *Cadpak* is. Of course, it has the standard line, box, circle, multiple screens, fill and zoom functions most of the others have. But it also has many features none of the others have. For instance, it has a crosshair function, which allows you to easily draw straight lines, and has a grid mode which allows you to draw only at the corners of eight-by-eight pixel blocks. It has the ability to add text to the screen, but in addition to the Commodore character set, there are nine additional character sets that can be loaded into memory. You can print normal size or expanded size (twice the normal height and width). It also has a special Flexi mode which allows for custom character sets that are designed as double height/double width, not simply expanded. This gives you much better looking characters.

A number of special library screens are on disk that you can recall and use in your drawings. There is a set of electrical engineering symbols, circuit parts, mathematical symbols, architectural symbols and even a collection of music symbols.

Flexidraw *may be the best drawing/drafting system available for the serious Commodore 64 light pen user.*

If you are planning to add color to your screen, you can turn on a special form of grid, which gives a checkerboard appearance to the screen. Each of the blocks corresponds to a color cell in the computer, and by paying close attention to detail, you can add many different colors to the picture. However, you don't color directly from *Flexidraw*. Instead, you load a program called Pen Palette which allows you to paint your *Flexidraw* picture.

Another very interesting feature is the ability to split screens, which puts half of one screen onto another. This means you can continue a large drawing to a second screen and when you print the picture, the screens line up perfectly.

Along with the main *Flexidraw* program and Pen Palette, there are a number of other programs on the disk, including a Sprite Editor, a Sprite Animator, and a Terminal Emulator that will send your *Flexidraw* picture over your modem to another *Flexidraw* user. While the *Flexidraw* system is expensive, you do get a lot for your money. I recommend *Flexidraw* to any 64 owner who wants a serious light pen graphics system.

As you can see, 64 owners have a large number of light pen packages to choose from. Once you begin using them, all other methods of drawing will feel awkward, and you will certainly wonder why it took you so long to make the plunge. C

Light Pen Manufacturers and Graphics Software Publishers

Tech Sketch Inc.
25 Just Road
Fairfield, NJ 07006

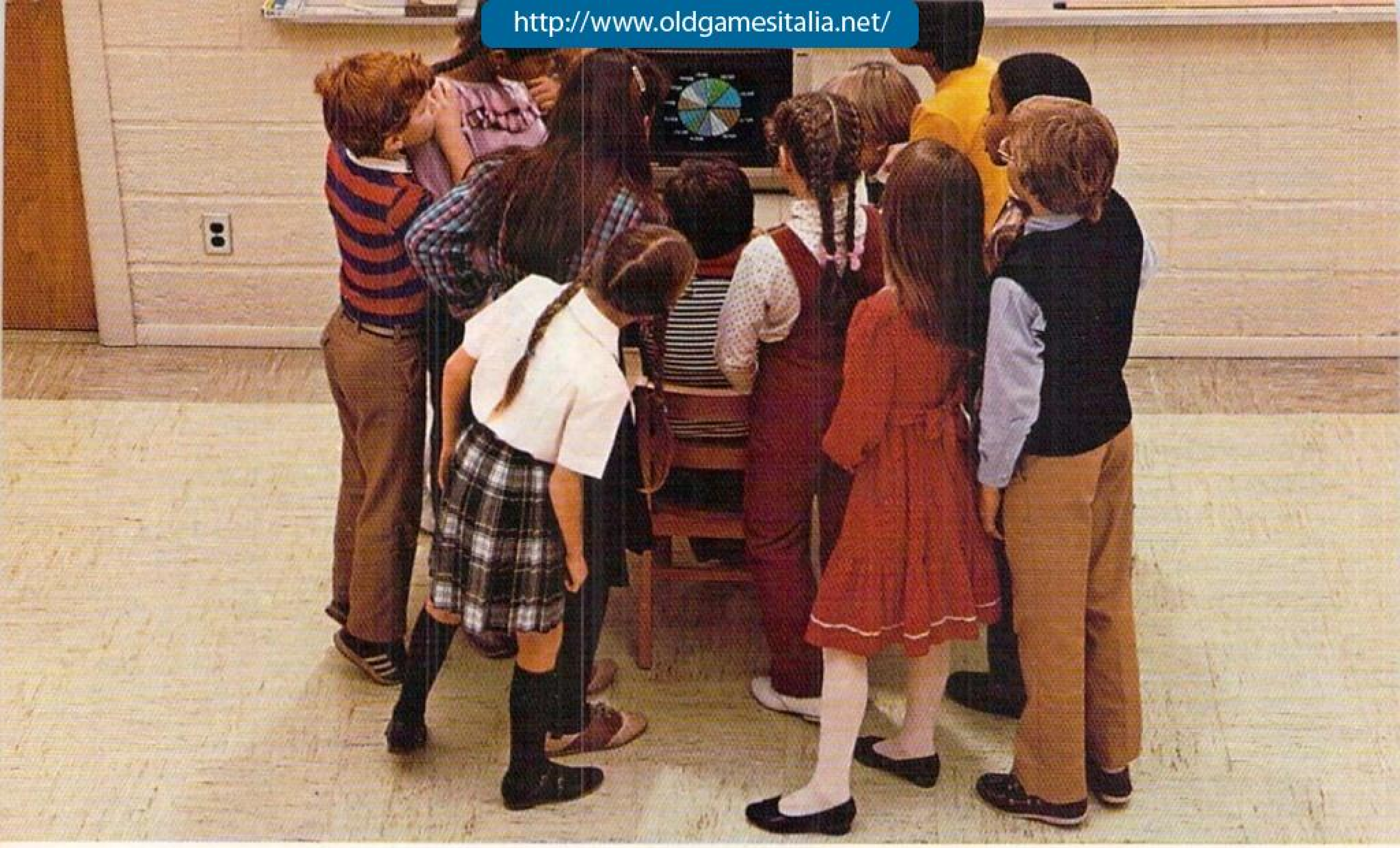
Madison Computer
1825 Monroe Street
Madison, WI 53711

Inkwell Systems
P.O. Box 85152 MB290
7677 Ronson Road
San Diego, CA 92138

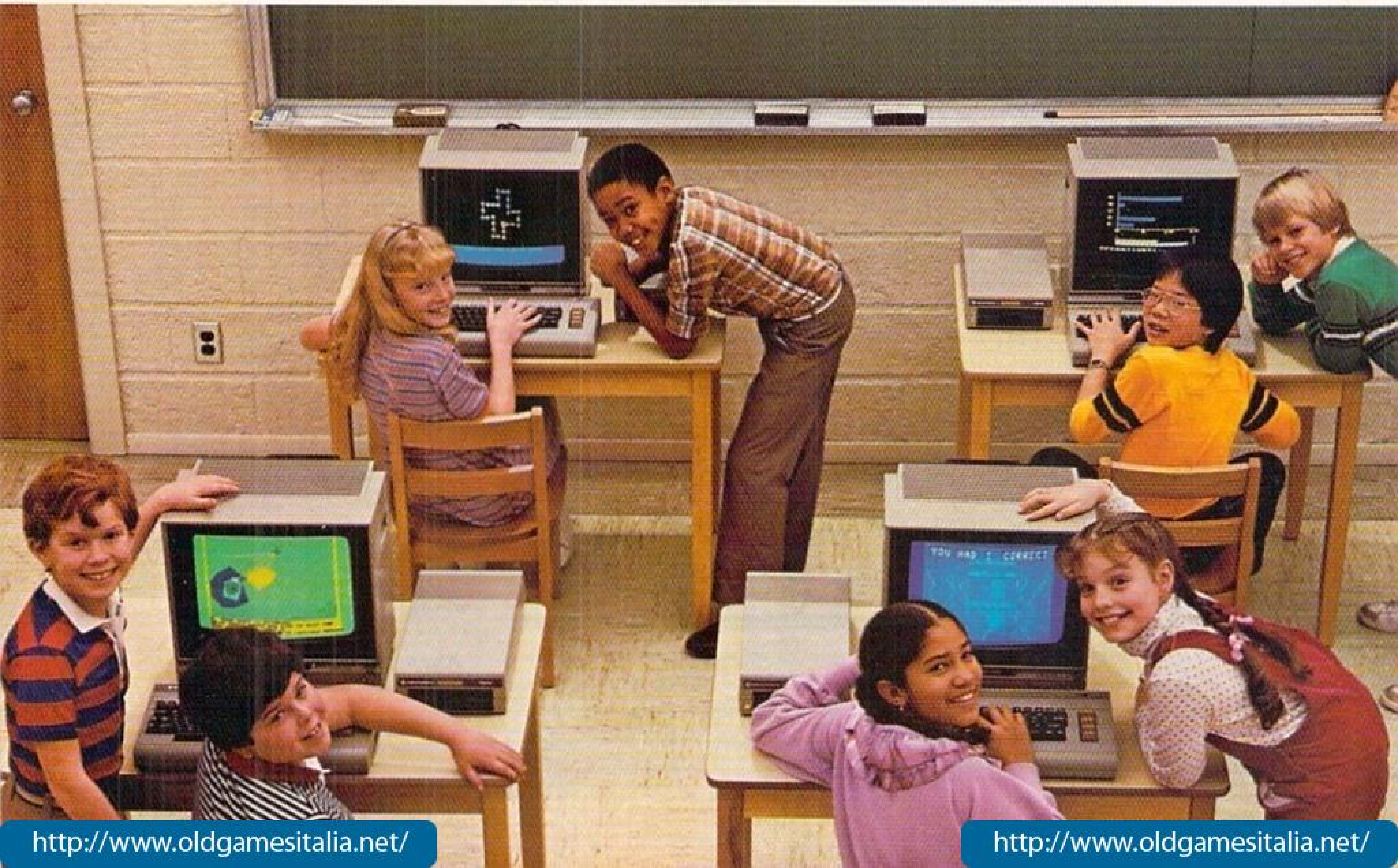
Koala Technologies Corp.
Patrick Henry Drive
Santa Clara, CA 95952

Baudville
1001 Medical Park Drive
Grand Rapids, MI 49506

Abacus Software
P.O. Box 7211
Grand Rapids, MI 49510



WHY THE COMMODORE 64 ISN'T IN A CLASS BY ITSELF.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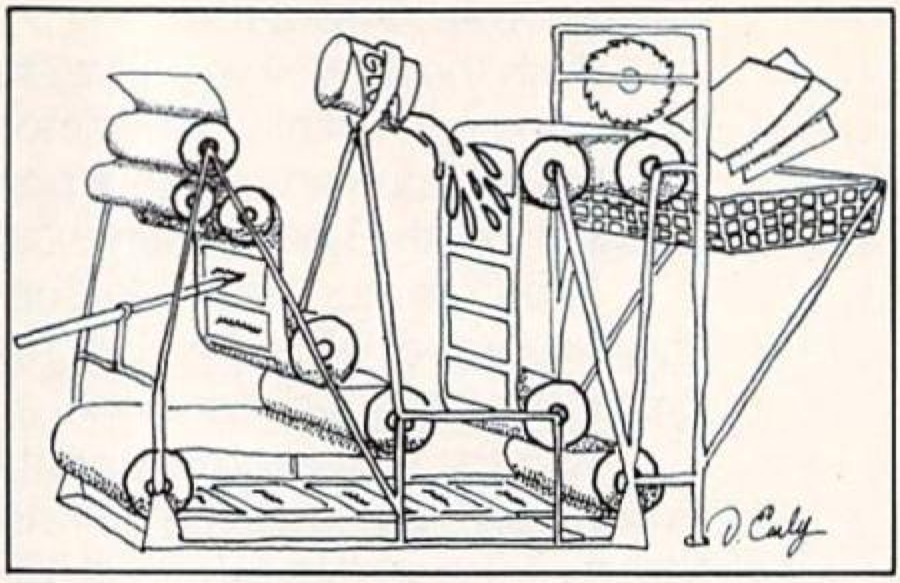
BY JOHN STILWELL

Label Maker for the Commodore 64 and VIC 20

Create address labels or name tags using your Commodore 1515 or 1525 printer.



Label Maker is designed for the unexpanded VIC 20 and Commodore 64 with the VIC1515, 1525 or 1525e Commodore graphic printers. Although it has not been tested, it should work on any dot matrix printer that has double-width characters.

Please note that this program is designed to use single-column labels (9 cm by 2.5 cm). You should be able to purchase them at any business supply store and most computer stores. If you can't find this size, you'll have to fiddle with the program to make it work for your size.

Keep in mind that these don't have to be only mailing labels. How about wise sayings, name badges or tags on presents?

Using the Program

First, put the labels into the printer. The sprocket units should be moved closer together if needed. The labels are put into the printer in the same way as normal paper, but because the labels are thicker than paper you might have to adjust the print head so that it sits farther away from the label. To do this, move the level on the print unit one or two notches counter-clockwise (see printer's operating manual).

Look down on the print head and you will see a slit in the center of it. Adjust the sprocket units so that the left edge of the label is in the center of this slit. The top of the label should line up with the top of the ribbon.

Now let's make a label. Run the program and it will remind you of how the printer should be set up. Next, you are asked if you would like the label to be printed in upper/lower case. Press Y if you do. If you press any other key, the computer defaults to upper case/graphics.

At this point, we enter the information we want on the label, up to a maximum of five lines. The cursor begins on a quotation mark. If you want to print characters like commas and semicolons, move the cursor to the right one space before typing the line. The computer will not accept most punctuation unless the first character in the line is a quotation mark.

If you want double-width characters, the first character in the line (after the quotation mark) must be an up arrow. The up arrow is located next to the RESTORE key. If you don't want anything on a line, press RETURN without entering anything.

The maximum number of normal print characters per line is 33. The maximum for double-width is 15. If you exceed the maximum, the cursor will go to the beginning of the line when you push RETURN.

When all the lines have been entered, you have the option of centering the lines vertically on the label. For example, if the address is three lines long and you entered it on lines one, two and three, when you center the address vertically, it will move to lines two, three and four.

The computer will now show the label on the screen. Lines that have double-width characters will be displayed in a colored bar. At the bottom of the screen, you will be asked if it looks correct. If it is not correct, press any key other than Y.

After you have the label to your liking, you are asked how many are to be printed and whether the lines should be left-justified (press T) or centered (press C). Generally, address labels are left-justified and name tags are centered.

At this point, the labels are printed. On the screen will be a colored bar with the label number in it so you can easily tell if the printing is nearly complete. If at any time during the printing you need to stop, hold down the RETURN key. The computer will stop the printing after it is finished with the present label. Pressing any key other than Y will cause the computer to continue the printing. This feature is very handy if you are printing a large number of labels and they go out of adjustment.

Label Maker assumes that it is one carriage return from the bottom of one label to the top of the next. If you need more, add them to line 270. This is a must if you should decide to print cassette labels. C

Label Maker

```
10 DIM L$(5),E%(5):DV=4'CPGB
15 PRINT T CHR$(9)CHR$(142)CHR$(8)"
   [BLUE,CLEAR]ALIGN PRINT HEAD AS
   [SPACE3]SHOWN"'EMQO
20 PRINT"[BLACK,DOWN,SPACE2,RVS,
   CMDR *,DOWN,LEFT2,SPACE2,RVOFF]
   [DOWN,LEFT3,RVS,SPACE2,RVOFF,
   SHFT T,DOWN,LEFT,SHFT T,UP,PURPLE,
   SHFT *2] LABEL[SPACE5,BLACK,RVS]
   SIDE[DOWN,LEFT4]VIEW"'BANS
25 PRINT"[PURPLE] [SHFT -,DOWN,LEFT,
   SHFT J,SHFT *] PRINT HEAD"'BALK
30 PRINT"[DOWN4,BLACK,SPACE3,SHFT R3,
   DOWN,LEFT5,RVS,SHFT POUND,CMDR C,
   CMDR V,CMDR *,DOWN,LEFT3,SPACE2]
   "'BABL
35 PRINT"[PURPLE,UP3,RIGHT7,SHFT I,
   DOWN,LEFT,SHFT J,SHFT *]
    LABEL"'BAOM
37 PRINT"[DOWN2,SPACE2,SHFT J,SHFT *]
    PRINT HEAD[SPACE2,UP2,BLACK,RVS]
   TOP [DOWN,LEFT4]VIEW"'BAIS
40 PRINT"[DOWN3,RVS,SPACE5]
   PUSH ANY KEY[SPACE5]"
   :GOSUB 330'CENG
45 REM *** UPPER/LOWER CASE ***'BVJK
50 PRINT"[CLEAR,DOWN2]UPPER & LOWER
   CASE?"'BAJH
55 GOSUB 330:IF A$="Y"THEN C$=CHR$(17)
   :PRINT CHR$(9)CHR$(14):GOTO 65'KXDR
60 C$=CHR$(15):PRINT CHR$(142)'EMYH
65 FOR I=1 TO 5:L$(I)="":E%(I)=0
   :NEXT I'GSKO
70 REM *** INPUT LABEL ***'BQWH
75 FOR I=1 TO 5'DDIK
80 PRINT"[CLEAR,BLUE]YOU HAVE A
   MAXIMUM OF [RVS]5[RVOFF]
    ROWS WITH [RVS]33[RVOFF]"'BAHP
82 PRINT"CHARACTORS PER ROW."
   :PRINT"[DOWN]IF THE 1ST CHARACTER";
   'CCTS
85 PRINT" IS '[^]' THEN THE ROW
   [SPACE3]WILL BE DOUBLE WIDTH."'BAUU
90 PRINT"[HOME,DOWN9]LINE #"I'BBDH
95 PRINT"[SPACE2]";CHR$(34);CHR$(34);
   CHR$(20);:IF E%(I)THEN PRINT"[^]";
   'HXXT
100 PRINT L$(I):PRINT"[HOME,DOWN9]
    "'CGIX
105 INPUT L$(I)'BFRB
110 IF LEFT$(L$(I),1)="[^]
    "THEN E%(I)=1:L$(I)=RIGHT$(L$(I),
    LEN(L$(I))-1)'JMIJ
112 IF LEFT$(L$(I),1)="[^]
    "THEN GOTO 120'FMWD
115 E%(I)=0'BGEC
120 IF LEN(L$(I))>33-E%(I)*16 THEN
    80'GSTE
125 NEXT I'BBCC
130 REM *** CENTER VERTICALLY ***'BWYE
135 PRINT"[DOWN]CENTERED VERTICALLY?"
    :GOSUB 330:IF A$<>"Y"THEN 185'GKNO
140 K=0:FOR I=1 TO 5:IF L$(I)<>""THEN
    I=5:GOTO 150'KSEJ
145 K=K+1'CDJG
150 NEXT I'BBCA
155 KK=0:FOR I=1 TO 5:IF
    L$(6-I)<>""THEN I=5:GOTO 165'LUEQ
160 KK=KK+1'CFJD
165 NEXT I'BBCG
170 IF K+1<KK THEN FOR I=1 TO KK-K-2
    :FOR J=5 TO 2 STEP-1'OPLO
172 IF K+1<KK THEN L$(J)=L$(J-1)
    :E%(J)=E%(J-1):NEXT J:L$(1)=""
    :NEXT I'LMAT
175 IF K>KK THEN FOR I=1 TO K-KK-1
    :FOR J=1 TO 4:L$(J)=L$(J+1)'NAAV
177 IF K>KK THEN E%(J)=E%(J+1):NEXT J
    :L$(5)="":NEXT I'IYVT
180 REM *** CHECK LABEL ***'BQWH
185 PRINT"[CLEAR,RVS]LABEL CHECK"'BANM
190 PRINT"[DOWN]IF THE LINE IS
    REVERSED, THEN IT IS DOUBLE
    [SPACE2]WIDTH LETERS.[DOWN3]"'BACT
195 FOR I=1 TO 5:IF E%(I)THEN PRINT"
    [BLACK,RVS]"I"[PURPLE]"L$(I)
    :GOTO 205'HTXS
200 PRINT"[BLACK,RVS]"I"[RVOFF,PURPLE]
    "L$(I)'BGPY
205 NEXT I'BBCB
210 PRINT"[BLACK,DOWN] IS THIS LABEL
    OK?"'BANC
215 GOSUB 330:IF A$<>"Y"THEN 75'FIEH
220 PRINT"[CLEAR]HOW MANY?":INPUT A$
    :N=VAL(A$):IF N<1 THEN 185'HPDI
225 PRINT"[DOWN3]CENTERED OR[SPACE11]
    LEFT JUSTIFIED"'BANM
230 GOSUB 330:IF A$="L"THEN CH$="L"
    :GOTO 250'GNAF
235 IF A$="C"THEN CH$="C"
    :GOTO 265'FJUJ
240 GOTO 230'BDEB
245 REM *** LEFT JUSTIFY ***'BRCJ
250 K=1:FOR I=2 TO 5:IF
    LEN(L$(I))>LEN(L$(K))THEN K=I'KXSM
255 NEXT I:A$="":FOR I=1 TO
    INT((33-E%(K)*16-LEN(L$(K)))/2)
    :A$=A$+" ":NEXT I'OKLW
260 REM *** SENT TO PRINTER ***'BTOH
265 OPEN 4,4:IF C$=CHR$(17)THEN CLOSE
    4:OPEN 4,4,7'HRTO
270 FOR K=1 TO N:PRINT"[HOME,DOWN7,
    RVS]LBL"K'EFFI
275 GET Z$:IF Z$=""THEN 295'EIPM
280 IF Z$="Q"THEN CLOSE 4
    :GOTO 180'FHCI
285 PRINT"[HOME,DOWN9,RVS]
    PUSH ANY KEY"'BACN
290 GET Z$:IF Z$=""THEN 290'EIKJ
291 IF Z$="Q"THEN 280'DFCJ
292 PRINT"[HOME,DOWN9,SPACE12]"'BAVJ
295 FOR I=1 TO 5:PRINT#DV,C$;:X$=""
    :IF E%(I)THEN X$=CHR$(14)'JAQV
300 IF CH$="L"THEN PRINT#DV,
    C$+A$+X$+L$(I)+CHR$(15)
    :GOTO 310'KANJ
305 A$="":FOR J=1 TO INT((33-E%(I)
    *16-LEN(L$(I)))/2)'KBBN
307 A$=A$+" ":NEXT J:PRINT#DV,
    C$+X$+A$+L$(I)+CHR$(15)'JAQP
310 NEXT I:PRINT#DV,CHR$(15)'DJYB
315 NEXT K:CLOSE 4'CDSE
320 PRINT"[DOWN2]DO YOU WANT MORE?"
    :GOSUB 330:IF A$="Y"THEN 185'FKKJ
325 GOTO 65'BCSE
330 GET A$:IF A$=""THEN 330'EIFE
335 RETURN'BAQF
```

END

BY GERHARD SCHILLING

PEEK-A-POKE for the Commodore 64

Would you like to demonstrate to your friends a few of the more exotic peeks and pokes which your Commodore 64 can provide? Some may surprise you.

The program needs no instructions prior to using it. Simply type it in, save it on tape or disk, and then run it. Eight different uses of PEEK, POKE, WAIT and TAB will be demonstrated on the screen.

So much for the fun part. For those interested in programming techniques, there are a few more goodies.

When typing in the program, use the strangely sequenced line numbers precisely as given in the listing. Spaces between characters are not important, except where specially marked. They are there only to make the program easier to read. But be careful to place all quotation marks, colons and semicolons correctly. Here is the reason: The program incorporates a self-programming technique. The computer all by itself will generate and insert additional program lines and you don't have to do a thing to make it happen. You can just sit back, relax and watch the screen while the computer does the work. How is that for saving a lot of typing labor?

Program Operation

The program as shown in the listing is only the initial skeleton. After you have typed in the 130 lines, they will take up about 4.3K bytes of memory. Be sure to save the program at this stage.

When you now run it, 90 more lines will be added by the computer automatically. For a period of about 20 seconds, you need only watch the computer do this additional typing.

Eight different screens will flash by, all filled with program lines. The Commodore 64, after all, types somewhat faster than you or I. Don't touch the keyboard until the computer has finished this self-programming part and tells you that it is ready for you.

Interested in useful peeks and pokes? How about just relaxing while the computer programs itself? It's all here in a 130-line BASIC program.

Now the actual demonstration program is complete and you will have to do *some* work yourself, such as hitting the RETURN key once in a while.

After the demonstration program is over and you have recovered from your surprise, you might want to take a look at the complete program. If possible, list it on a printer.

All newly computer-generated lines will be identified by a colon following the line number. These colons serve no other purpose than to let you find these lines easily in the listing. In addition, line numbers followed by two colons will draw your attention to the utility commands which were demonstrated.

For example, line 400 is a simple instruction to make all keys repeating keys, or "autokeys" as they are called on a typewriter.

Line 500 will stop everything and, incidentally, simulate a dreaded crash. Inserting this line in any program would truly mystify your friends. Only you will know how to bring the Commodore 64 alive again.

After the program has been run once, it will from then on jump over the self-programming part and present the demonstration program. Line 25 will do that.

If you wish, you can now delete all program lines numbered higher than 960. The computer could have done that easily, too, but I thought that you might want to see the complete listing. Additional information for you experienced programmers is given in the two tables and in the next section.

But remember, all you really need to do is run the program as given in the listing to impress your friends with some of the hidden capabilities of your Commodore 64.

Program Routines

The following explanations will make sense only after the program has been run at least once.

Table 1 outlines the structure of the demonstration program and shows its rather conventional use of BASIC. It could have been condensed and some GOTO instructions could have been avoided. But this would have made it more difficult to type in and understand.

Line 72 is a device to empty the keyboard buffer. (See page 93 of the *Commodore 64 Programmer's Reference Guide.*) Such a line is inserted at several places, especially where the operator is not supposed to touch the keyboard while a demonstration command is being executed as, for instance, in lines 614 to 640. If the user presses a key in spite of instructions to the contrary, such key presses will be nullified.

The eight demonstrations of PEEK, POKE, WAIT and TAB commands are fully explained during the running of the program. Some may be new to you and useful in your own programming.

For example, line 400 is the command instruction for autokeying. Once inserted in a program, it will remain in effect until the computer is turned off or until line 470, the default condition, is inserted. Line 410 is the way of printing this command on the screen for the demonstration.

However, if the demonstration line to be printed on the screen contains a quote mark, then the CHR$(34) code for a quote must be used. Compare line 810, which is the command used in the program, with line 800, which only illustrates this command on the screen. When the program is run, the *screen* will display:

```
800 PRINT TAB(250)''THAT'S
         ENOUGH, FOLKS.''
```

A few lines down, at TAB position 250, will appear:

```
THAT'S ENOUGH, FOLKS.
```

Now look at lines 2570 to 2574. You will see how line 2572 was used earlier to self-print the program line 800 and line 2574 to self-print program line 810. (Q$ is the CHR$(34) code for the quote mark.)

Self-Programming Technique

Table 2 outlines the structure and flow of the self-programming part. This is a useful technique, but you should always ask whether it actually saves time or effort. The answer will depend on the specific program and your programming style.

In a long program that uses many lines and expressions that are similar or identical, the savings can be considerable. Especially with regard to the typing in of reams of program lines or data statements.

The general technique is well known to professional programmers and a simple BASIC version for the Commodore 64 is developed and described here. Look at lines 2000 to 2090 and disregard for the moment that some of these lines were themselves generated earlier by the computer.

Line 2000 sets the string Q$ equal to quote mark—CHR$(34); clears the screen—CHR$(147); and moves the cursor down twice—CHR$(17).

Table 1. Structure of Demonstration Program

Lines	Subject	Contents
10-22	Preface	Heading
25	Jump Instruction	After the complete program has been generated.
30-60	Self-Programming Instructions	Goes twice to section 1000.
64	Routing	Goes to sections 2000-2500.
70-90	End of Preface	Self-programming completed.
92-98	Introduction	Demo program starts here.
100-190	Demo No. 1	Commodore 64 or VIC 20?
200-290	Demo No. 2	Upper or lower case?
300-390	Demo No. 3	Changing the cursor blink rate.
400-490	Demo No. 4	Repeating keys.
500-590	Demo No. 5	Stop everything until . . .
600-690	Demo No. 6	Turn screen off and on.
700-790	Demo No. 7	Checkmark and positioning.
800-890	Demo No. 8	TAB setting.
850	END	End of demonstration program.
900-920	Sub-Section	Prints dashes across; waits until ready to continue; clears screen.
950-960	Sub-Section	Program length in bytes.

Table 2. Structure of Self-Programming Part

Lines	Purpose
1000-1090	Generates the skeletal structure of sections 2000 to 2500.
1500-1510	Adds to the program the self-printed lines in section 1000 and in sections 2000 to 2500.
2000-2090	Generates 13 PRINT lines and program line 25.
2100-2190	Generates eight GOSUB 900 lines.
2200-2290	Generates GET JUNK and time delay lines.
2300-2340	Provides the command lines for Demos 1, 2 and 3.
2350-2390	Generates additional program lines for Demos 1, 2, 3 and 4.
2400-2440	Generates additional program lines for Demos 3 and 4.
2450-2490	Provides the command lines for Demos 4, 5 and 6.
2500-2542	Generates PRINT:PRINT lines.
2550-2560	Provides the command lines for Demo 7.
2570-2590	Provides the command lines for Demo 8.
2600	Returns to line 70 to start the demonstration program.

Lines 2010 to 2040 print 13 program lines on the screen, namely:

```
112 :PRINT
122 :PRINT
212 :PRINT
222 :PRINT
```

and so forth to 812 :PRINT. As mentioned earlier, the colon is not necessary.

Line 2050 prints program line 25 on the screen, explained in Table 1.

Line 2080 prints the direct instruction GOTO 2100 on the screen. (The "WAIT:" is there only to keep the operator from believing that the computer has hung up. Forget it for now.)

Line 2090 *does not* print on the screen. It instructs the computer to go to line 1500 after completing the screen printing.

Lines 1500 and 1510 constitute a separate section which is used over and over again. Line 1500 asks for 15 successive RETURN's (POKE 63X, 13). Line 1510 then instructs the computer to put these 15 pokes into the keyboard buffer with POKE 198, 15; to go HOME—CHR$(19); and when finished to END *this* process.

This procedure in lines 1500 and 1510 is equivalent to your moving the cursor by hand up to the first line printed on the screen and hitting RETURN successively 15 times. (Without hitting READY by accident and thereby asking the computer to READY. It will properly refuse with an "out of data error:") The RETURN executions convert the lines printed on the screen into actual program lines, inserted at the correct place for each line number.

But while doing so, the direct command GOTO 2100 is encountered when the program reaches line 2080, made effective by the RETURN procedure. Instead of ending, the computer therefore goes to line 2100 where it finds a new series of self-printing instructions. And so on.

A simple way to end the self-printing part is shown in the last section. Lines 2580 and 2600 lead back to the main program.

Clearly, the same technique could also have been used to automatically delete all lines not needed any more for the running of the documentation program.

Note that in this simple technique

all variables are deleted by the Commodore 64. Thus, the Q$ assignment as a quote has to be repeated each time, as in lines 2100 and 2200.

Note also that the screen must not be overfilled and caused to scroll. If you attempt to use more than 15 instructions in lines 1500 and 1510, you may get a surprise. Save your program before you try that!

Illustration

Here is a way to see the technique in operation. Insert, temporarily, the following two lines:

```
2085 STOP
2105 STOP
```

Now type RUN 2000. The screen will fill with the lines to be programmed. At the bottom of the screen will be the information:

```
BREAK IN 2085
READY.
```

Now type CONT. The READY notation will appear again on top of the screen. The computer will do its thing—that is, go through the keyboard buffer entry routine of RETURN's. After about three or four seconds, the screen should clear and display:

```
BREAK IN 2105
READY.
```

The 13 PRINT lines are now part of the program, and so is line 25.

As shown in Table 2, this self-programming routine is first used in section 1000 according to the instructions in lines 50 and 60. Section 1000 generates several program lines which are used later repeatedly in sections 2000 through 2500.

And that's all there is to it. You originally had to type in 130 lines. The computer inserted 90 additional lines. The amount of effort saved may appear to be small, but only because this specific program is intended to illustrate the technique and not hide it.

Nevertheless, you might notice that the phrase "That's enough, folks" appeared twice—in lines 800 and 810. Yet it had to be typed in only once—in line 2570.

And that's really enough, folks. ◼

PEEK-A-POKE

```
10 CLR : PRINT CHR$(147)'DGJA
20 PRINT"HI! I AM YOUR USER-FRIENDLY
   COMMODORE 64"'BARJ
22 PRINT : GOSUB 950 : PRINT'DFIC
30 PRINT"BUT FIRST,"'BAVC
32 PRINT"LET ME DO SOME ADDITIONAL
   PROGRAMMING."'BAAL
40 PRINT : PRINT"SIT BACK, RELAX,
    AND WAIT..."'CBGI
42 FOR T=1 TO 3000 : NEXT T'EIVG
50 B=2000 : W=60 : GOTO 1000'DOBF
60 B=2300 : W=64 : GOTO 1000'DOIG
64 GOTO 2000'BEYH
70 PRINT CHR$(147)'CFBF
74 PRINT"I AM FINISHED. NOW THE"'BADN
76 GOSUB 950 : PRINT'CEDK
80 PRINT"A N D[SPACE4]N O W :"'BARH
92 PRINT" LET'S EXPLORE A FEW A FEW
   OF THE MORE"'BAQR
94 PRINT TAB(8) "EXOTIC PEEKS AND
   POKES!"'CCCQ
98 PRINT"FOR EXAMPLE:" : PRINT'CBUR
140 PRINT"A COMMODORE 64"'BACD
150 PRINT"(P=34 WOULD MEAN A
    VIC-20)"'BAJG
240 IF P=21 THEN PRINT"NORMAL 'UPPER
    CASE/GRAPHICS' MODE."'EDOM
250 IF P=21 THEN PRINT"(IF YOU WANT
    TO SWITCH: POKE 53272, 23)"'EDJN
260 IF P=23 THEN PRINT"SO-CALLED
    'UPPER CASE/LOWER CASE'
    MODE."'EDBP
270 IF P=23 THEN PRINT"(IF YOU WANT
    TO SWITCH: POKE 53272, 21)"'EDJP
332 PRINT"THE NORMAL BLINKING RATE OF
    THE CURSOR."'BAGN
334 ::POKE 56325,10 : PRINT'CLLH
340 PRINT"HAVE YOU NOTICED? I JUST
    SPEEDED IT UP!" : PRINT"(P IS NOW
    10)"'CBKP
350 PRINT"JUST FOR FUN:"'BABG
352 PRINT"PRESS THE 'CURSOR RIGHT'
    KEY"'BAYM
354 PRINT : U$=CHR$(145)'DIAJ
370 ::POKE 56325,58'BKSG
382 PRINT"(TO CHANGE IT YOURSELF,
     POKE 56325,N"'BAJQ
384 PRINT"WHERE N IS ANY NUMBER
    BETWEEN 1 AND 255)"'BALT
416 PRINT"WITH THIS LINE,
     I HAVE JUST MADE ALL THE
    STANDARD KEYS -";'BBCU
418 PRINT"'REPEATING KEYS'"'BAPL
450 PRINT"GO AHEAD AND TRY"'BARH
452 PRINT" - HOLD A KEY DOWN!"
    : PRINT'CBPK
470 ::POKE 650,0'BHCH
510 PRINT : PRINT"WITH THIS LINE,
     I HAVE JUST STOPPED"'CBBK
520 PRINT CHR$(18) TAB(11)
    "EVERYTHING"'DHLH
530 PRINT"UNTIL THE 'COMMODORE' KEY
    IS DEPRESSED!" : PRINT'CBKN
540 PRINT"TRY! NO OTHER KEY WILL
    DO..." : PRINT'CBJL
570 PRINT "WELL DONE; LET'S GO
    ON."'BADM
610 PRINT : PRINT"THIS LINE TURNS THE
    SCREEN OFF:"'CBPK
614 PRINT"(DON'T TOUCH ANYTHING. JUST
    WAIT) [BACK ARROW] [BACK ARROW]
    "'BAMP
680 PRINT"THIS SPEEDS UP THE RUNNING
    OF A PROGRAM."'BANT
684 PRINT : PRINT"P.S.: I TURNED THE
    SCREEN BACK ON WITH:"'CBHX
720 PRINT"LET ME SHOW YOU A NEW
    CHARACTER:"'BAAM
730 PRINT"GIVE A LINE NUMBER (BETWEEN
    10 AND 13)"'BAGN
732 INPUT"LI ="; LI'BDXI
740 PRINT"NOW A COLUMN NUMBER
    (BETWEEN 0 AND 39)"'BAUP
```

```
742 INPUT"CO ="; CO'BDRJ
760 PRINT"YOU PROBABLY DID NOT KNOW
    THAT I CAN"'BAIR
762 PRINT"PROVIDE A CHECKMARK,
     AND THAT YOU CAN"'BAOT
764 PRINT"PLACE IT ANYWHERE ON THE
    SCREEN!"'BAYU
766 PRINT"W A I T . . ."'BAFQ
782 ::PRINT CHR$(142) : PRINT'DIRO
784 PRINT "(UNFORTUNATELY,
     ONLY IN LOWER CASE.)"'BAWX
820 PRINT"JUST TO SHOW YOU THAT YOU
    CAN USE TAB"'BAKO
830 PRINT"VALUES UP TO 255."'BAHJ
840 PRINT TAB(10) "END"'CDJI
850 END'BACH
900 PRINT : FOR X=1 TO 40:PRINT "-" ;
    :NEXT X'GJFI
910 INPUT"HIT 'RETURN' TO CONTINUE
    [BACK ARROW] [BACK ARROW]";
     K$'BDPM
920 PRINT CHR$(147) : PRINT
    : RETURN'EHGI
950 PRINT"CURRENT PROGRAM LENGTH IS
    :";'BBEQ
960 PRINT 38909-(FRE(1)-(FRE(1)<0)
    *65536) "BYTES" : RETURN'IWDT
1000 Q$=CHR$(34):PRINT CHR$(147)
     CHR$(17) CHR$(17)'GUTB
1010 FOR L=B TO B+200 STEP 100'FJDY
1020 PRINT L":Q$=CHR$(34)
     :PRINT CHR$(147) CHR$(17)
     CHR$(17)"'BBLG
1040 PRINT L+40":NEXT L"'CDVA
1050 PRINT L+80":PRINT"Q$"GOTO"L+100"
     [SPACE6]W A I T[SPACE2]!"'DJIH
1051 REM ^ 1050 PRINT L+80"
     :PRINT"Q$"GOTO"L+100"[SPACE6]
     W A I T[SPACE2]!"'BVHO
1060 PRINT L+90":GOTO 1500"'CDOD
1070 NEXT L'BBFA
1080 PRINT"GOTO"W"[SPACE10]W A I T
     [SPACE2]!"'BBDG
1081 REM ^ 1080 PRINT"GOTO"W"[SPACE10
     W A I T[SPACE2]!"'BLAN
1090 GOTO 1500'BEDD
1500 ::FOR X=1 TO 15:POKE 630+X,13
     :NEXT X'GQXF
1510 ::POKE 198,15:PRINT CHR$(19)
     :END'EOCE
2010 FOR L=112 TO 812 STEP 100'EKOY
2020 PRINT L":PRINT"'BBCX
2022 IF L>600 THEN 2040'DINB
2030 PRINT L+10":PRINT"'CDNA
2050 PRINT 25":GOTO 92:REM PROGRAM
     COMPLETED BY COMPUTER"'BCCL
2110 FOR L=90 TO 790 STEP 100'EJBA
2120 PRINT L":GOSUB 900"'BBVA
2210 FOR L=560 TO 630 STEP 70'EJCB
2212 IF L=560 THEN 2230'DIUC
2220 PRINT L-10":FOR T=1 TO 2000
     :NEXT T"'CDCF
2230 PRINT L":GET JUNK$
     :IFJUNK$ <>" Q$ Q$ "THEN" L'BGGH
2232 IF L=72 THEN 2280'DHAE
2234 IF L=780 THEN 2260'DICG
2250 FOR L=660 TO 780 STEP 120
     : GOTO 2220'FPJH
2260 L= 72 :GOTO 2230'CIPE
2320 P$(1)="PEEK(65532)"
     :P$(2)="PEEK(53272)"
     :P$(3)="PEEK(56325)"'DREL
2330 FOR L=100 TO 300 STEP 100'EKDE
2332 PRINT L"::P=" P$(L/100)'CJGG
2334 PRINT L+10":PRINT" L+10 Q$ "P="
     P$(L/100) " : PRINT P"'EQDO
2336 PRINT L+30":PRINT" Q$ "LINE"
     L+10 "TELLS ME YOU ARE
     USING"'DIKS
2350 FOR L= 120 TO 220 STEP 100'EKGG
2360 PRINT L":PRINT" Q$ "THAT GIVES P
     =" Q$ "P"'BFWK
2362 PRINT L+250":PRINT:PRINT
     :PRINT" Q$ "BACK TO NORMAL."'CGAQ
2370 NEXT L'BBFE
2410 FOR L=360 TO 460 STEP 100'EKSD
2420 PRINT L":PRINT CHR$(18)" Q$ "BUT
     THEN HIT 'RETURN'"'BDSK
2430 PRINT L+2":PRINT TAB(30) U$ U$
     U$;:INPUT K$"'CCXK
2450 P1$="POKE 650, 128"
     :P2$="WAIT 653,2"'CHFL
2452 PRINT 400"::" P1$'BGVH
2454 PRINT 410":PRINT" 410 Q$ P1$'BLTL
2456 PRINT 500"::PRINT" 500 Q$
     P2$'BLEN
2458 PRINT 550":" P2$'BGUN
2460 P3$="POKE 53265, PEEK(53265)"
     :P4$="AND 239":P5$="OR 16"'DLQQ
2462 PRINT 600":PRINT" 600 Q$ P3$
     P4$'BOKL
2464 PRINT 640"::" P3$ P4$'BJWK
2466 PRINT 670"::" P3$ P5$'BJBM
2468 PRINT 686":PRINT" 670 Q$ P3$
     P5$'BOHR
2510 FOR L=342 TO 642 STEP 300'EKWE
2520 PRINT L":PRINT:PRINT"'BBBF
2530 IF L=672 THEN 2550'DIEF
2542 FOR L=96 TO 672 STEP 576
     : GOTO 2520'FOIL
2550 P1$="POKE 214, LI : PRINT
     : POKE 211, CO"'BDWN
2552 P2$="CHR$(186) CHR$(14)"'BDXL
2554 PRINT 700":PRINT" 700;
     : PRINT Q$ P1$'CNMN
2556 PRINT 702":PRINT" 702 Q$ "PRINT";
      : PRINT P2$'CNHR
2558 PRINT 750"::" P1$'BGEO
2560 PRINT 752"::PRINT" P2$'BGDI
2570 P1$="THAT'S ENOUGH, FOLKS."'BDSM
2572 PRINT 800":PRINT" 800 Q$ "PRINT
     TAB(250)" Q$ "CHR$(34)" Q$
     P1$'BPLS
2574 PRINT 810"::PRINT TAB(250)" Q$
     P1$'BIIQ
2600 GOTO 70'BCOA
```

END

BY JERRY A. STURDIVANT

Marquee for Commodore 64 or PET

This program allows you to type a message then have it scroll horizontally from right to left in a large 5" × 5" character set of your own design. It can be seen at a distance and it's a good attention getter for advertising or leaving a message.

Having a PET, I was never able to generate a character set before. This five-by-five format allows me to "draw" just about anything.

I have taken all characters from CHR$(32) to CHR$(95) and enlarged them. I used the last five keys to design special characters. Using the small four-square character gives you the possibility of a 100-pixel format per character. When any one "pixel" of a character is printed to the screen a REV or OFF is printed first. This allows you to use anything on the keyboard—shifted, unshifted and reversed.

For the character designs of the alphabetical characters, I used only the first four columns. The last column is for spacing. By using the fifth column on special characters, you can make them wider or run them together. On my set, for instance, the right bracket on the keyboard prints a train car, which connects to the next car. Using this technique, it is possible to design one long, unique character.

Although my alphabet is rather standard fare, it is possible to design any desired characters, including script.

This scrolling marquee can be seen at a distance, so it's a great attention getter for advertising or other messages.

Machine language is used for the scrolling.

Program Operation

On initializing, A$ (the message) may be DIMentioned to be as big as your memory can stand. I have put it arbitrarily at 100 because I believe a reader's attention span would wane long before the completion of a message 3,900 characters long.

After POKEing the machine code, the program checks to see if the computer is a Commodore 64. If it is, the screen location portion of the machine language is modified and shortened, screen color is changed and screen columns one and 40 are included (in case you are re-running the program—more on this later).

The remainder of the initializing is the L$'s. I have demonstrated the switching procedure at the end of the program. By changing line 4490 to "GOTO 4530," L$(321) through L$(325) are reinitialized with the new character. This procedure allows more than one character set in the program to be switched in or out with the change of GOTO's or REM's.

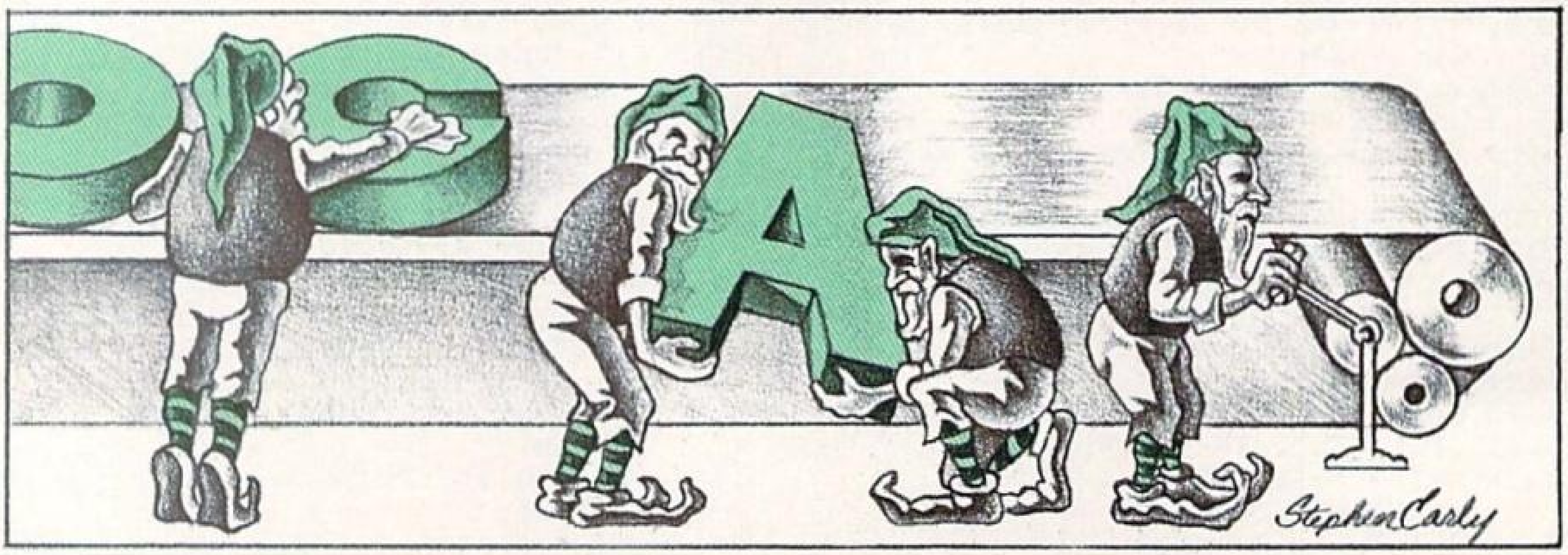
Screen Input

Hitting RETURN brings us to line 280. The loop sets up the screen for the later model 647's, positions the cursor and, if it's a 64, removes columns one and 40 for a cleaner presentation. Then we enter into five loops.

```
G loop: Select string of message
  H loop: Select letter of string.
          Find that letter's new character.
    I loop: Select column of new
            character.
            SYS, scroll screen one column
            to the left.
      J loop: Select a line of that column
              PRINT that "pixel."
      Next pixel.
              SYS could have gone here.
    Next Column of letter.
  Next Letter of string.
Next String of message.
Run message again.
```

The machine language for scrolling the screen is nothing glamorous, but is easily changed for the 64. If you disassemble it, you will see that for the PET, after scrolling everything left, I put blank spaces ($20) in column 40. This cleans up the presentation quite a bit. To see how it is without it, run a program, then hit STOP. POKE 863,96, then GOTO 280. On the 64, just REM out the POKE in line 280. The characters give the appearance of "peeling off." This is one of the reasons for removing column 40 on the 64.

There may appear to be some redundancies in the way the character strings are made (needless REVOFFs) but this makes the designs more evident and facilitates any changes.



Marquee

```
10 GOTO 410 MARQUEE BY JERRY
   STURDIVANT'BCEF
20 "[SPACE7,CMDR U27]"'AAXS
30 PRINT"[CLEAR,DOWN2,SPACE5]
   TYPE MESSAGE UP TO 13 LINES."'BAPI
40 PRINT"[DOWN]WHEN FINISHED HIT 3
   SPACES AND 'RETURN'"'BAWK
50 PRINT"[DOWN2,SPACE5][=HAPPY FACE
   [SPACE3]]=TRAIN CAR"'BANJ
60 PRINT"[DOWN,SPACE5,POUND]=BOAT
   [SPACE3,BACK ARROW]=ARROWS[SPACE3,
   ^]=MAN"'BAEJ
70 PRINT"[DOWN,CMDR P]"'BAOE
80 N=1'BCXF
90 GET G$:IF G$=""THEN 90'EHDI
100 IF G$=CHR$(20)THEN 200'EJPY
110 IF G$=CHR$(13)THEN 280'EJAA
120 IF ASC(G$)<32 OR ASC(G$)>95 OR
    L=494 THEN 90'JSMG
130 IF LEN(A$(N))=38 THEN N=N+1
    :PRINT"[LEFT2] "'HNPG
140 A$(N)=A$(N)+G$:L=L+1'EQUF
150 PRINT"[HOME,RVS]LINE #"N,Q$'BEDD
160 FOR D=1 TO N'DDDD
170 PRINT:NEXT'CBJD
180 PRINT A$(N)+"[CMDR P]"'CFVF
190 GOTO 90'BCQE
200 IF N=1 AND L=0 THEN 30'FGMA
210 A$(N)=LEFT$(A$(N),LEN(A$(N))-1)
    'EVRD
220 PRINT"[UP]"A$(N)+"[SPACE2]":L=L-1
    :IF L=0 THEN 30'HORG
230 IF A$(N)=""THEN N=N-1'FISE
240 IF N=0 THEN 80'DEBC
250 GOTO 150'BDFC
260 "[SPACE6]PRINT TO SCREEN"'AACG
270 "[SPACE5,CMDR U17]"'AAHP
280 PRINT"[CLEAR]"Q$:FOR F=1 TO 239
    :PRINT" ";:NEXT:POKE 53270,
    PEEK(53270)AND 247'JDQQ
290 FOR G=1 TO N'DDGH
300 FOR H=1 TO LEN(A$(G))'EJVB
310 M=(ASC(MID$(A$(G),H,1))-31)*5'FTNF
320 FOR I=1 TO 5'DDIB
330 PRINT"[UP5]";'BBXD
340 SYS 826'BDLC
350 FOR J=1 TO 5'DDJE
360 PRINT MID$(L$(M+J),I*2-1,2);"
    [LEFT,DOWN]";'FQDK
370 NEXT J,I,H,G'BHOG
380 GOTO 290'BDKG
390 "[SPACE9]INITIALIZE"'AACK
400 "[SPACE8,CMDR U12]"'AAVH
410 CLR:Q$="[DOWN9]"'CDYB
420 PRINT"[CLEAR]"Q$ TAB(15)"[YELLOW]
    WAIT !"'CFME
430 DIM L$(325),A$(13)'BONE
440 GOTO 470'BDKD
450 "[SPACE9]POKE MACHINE CODE"'AAXI
460 "[SPACE8,CMDR Y19]"'AARS
470 FOR A=826 TO 880'DHMI
480 READ B:POKE A,B'CFWI
490 NEXT'BAEH
500 DATA 162,0,189,145,129,157,144,
    129,189,185,129,157,184'BYCJ
510 DATA 129,189,225,129,157,224,129,
    189,9,130,157,8,130,189,49,130,
    157'BMIM
520 DATA 48,130,232,224,39,208,221,
    169,32,141,183,129,141,223,129,
    141'BKTN
525 DATA 7,130,141,47,130,141,87,130,
    96'BFYM
530 GOTO 560'BDKD
540 "[SPACE9]IF C-64 CHANGE CODE"'AAKI
550 "[SPACE8,CMDR Y21]"'AAYU
560 IF PEEK(57345)<86 THEN 660'EMKK
570 FOR C=830 TO 857 STEP 3'EICK
580 POKE C,5-(C>846)'DJEK
590 NEXT:POKE 863,96'CHRK
600 POKE 53280,0:POKE 53281,0'CPLE
610 POKE 53270,PEEK(53270)OR 8'DOQF
620 GOTO 660'BDLD
630 "[SPACE9]CHARACTERS"'AAKH
640 "[SPACE8,CMDR Y12]"'AAJN
650 REM (SPACE)'BHAH
660 L$(6)="[RVOFF] [RVOFF] [RVOFF]
    [RVOFF] [RVOFF] "'BFOL
670 L$(7)="[RVOFF] [RVOFF] [RVOFF]
    [RVOFF] [RVOFF] "'BFPM
680 L$(8)="[RVOFF] [RVOFF] [RVOFF]
    [RVOFF] [RVOFF] "'BFQN
690 L$(9)="[RVOFF] [RVOFF] [RVOFF]
    [RVOFF] [RVOFF] "'BFRO
700 L$(10)="[RVOFF] [RVOFF] [RVOFF]
    [RVOFF] [RVOFF] "'BGHG
710 REM !'BBAC
720 L$(11)="[RVOFF] [RVS] [RVOFF]
    [RVOFF] [RVOFF] "'BGKH
730 L$(12)="[RVOFF] [RVS] [RVOFF]
    [RVOFF] [RVOFF] "'BGLI
740 L$(13)="[RVOFF] [RVS] [RVOFF]
    [RVOFF] [RVOFF] "'BGMJ
750 L$(14)="[RVOFF] [RVOFF] [RVOFF]
    [RVOFF] [RVOFF] "'BGLL
760 L$(15)="[RVOFF] [RVS] [RVOFF]
    [RVOFF] [RVOFF] "'BGOL
770 REM (QUOTE)'BHJK
780 L$(16)="[RVS,CMDR K,RVOFF,CMDR K,
    RVS,CMDR K,RVOFF,CMDR K,RVOFF]
     "'BGTP
790 L$(17)="[RVS,CMDR K,RVOFF,CMDR K,
    RVS,CMDR K,RVOFF,CMDR K,RVOFF]
     "'BGUQ
800 L$(18)="[RVOFF] [RVOFF] [RVOFF]
    [RVOFF] [RVOFF] "'BGPH
810 L$(19)="[RVOFF] [RVOFF] [RVOFF]
    [RVOFF] [RVOFF] "'BGQI
820 L$(20)="[RVOFF] [RVOFF] [RVOFF]
    [RVOFF] [RVOFF] "'BGIJ
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830 REM #'BBCF
840 L$(21)="[RVOFF] [RVOFF,CMDR K,RVS,
    CMDR K,RVOFF] [RVOFF] "'BGPL
850 L$(22)="[RVS] [RVS] [RVS] [RVS]
    [RVOFF] "'BGGK
860 L$(23)="[RVOFF] [RVOFF,CMDR K,RVS,
    CMDR K,RVOFF] [RVOFF] "'BGRN
870 L$(24)="[RVS] [RVS] [RVS] [RVS]
    [RVOFF] "'BGIM
880 L$(25)="[RVOFF] [RVOFF,CMDR K,RVS,
    CMDR K,RVOFF] [RVOFF] "'BGTP
890 REM $'BBDL
900 L$(26)="[RVOFF,CMDR I,RVS,CMDR C,
    RVS,CMDR V,RVOFF,CMDR I,RVOFF]
     "'BGDJ
910 L$(27)="[RVOFF,CMDR K,RVOFF,
    CMDR K,RVS,CMDR K,RVOFF] [RVOFF]
     "'BGUK
920 L$(28)="[RVS,CMDR C,RVS,CMDR C,
    RVS,CMDR V,RVOFF,CMDR I,RVOFF]
     "'BGCL
930 L$(29)="[RVOFF] [RVOFF,CMDR K,RVS,
    CMDR K,RVS,CMDR K,RVOFF] "'BGYL
940 L$(30)="[RVS,CMDR I,RVS,CMDR D,
    RVS,CMDR F,RVS,CMDR I,RVOFF]
     "'BGCM
950 REM %'BBEI
960 L$(31)="[RVS,CMDR D,RVS,CMDR F,
    RVOFF] [RVOFF,SHFT N,RVOFF] "'BGSP
970 L$(32)="[RVS,CMDR C,RVS,CMDR V,
    RVOFF,SHFT N,RVOFF] [RVOFF] "'BGNQ
980 L$(33)="[RVOFF] [RVOFF,SHFT N,
    RVOFF] [RVOFF] [RVOFF] "'BGHR
990 L$(34)="[RVOFF,SHFT N,RVOFF] [RVS,
    CMDR D,RVS,CMDR F,RVOFF] "'BGVS
1000 L$(35)="[RVOFF] [RVOFF] [RVS,
     CMDR C,RVS,CMDR V,RVOFF] "'BGWX
1010 REM &'BBFT
1020 L$(36)="[RVS,CMDR D,RVS,CMDR F,
     RVOFF] [RVOFF] [RVOFF] "'BGEA
1030 L$(37)="[RVS,CMDR C,RVS,CMDR V,
     RVOFF] [RVOFF] [RVOFF] "'BGYB
1040 L$(38)="[RVS,CMDR V,RVS,CMDR C,
     RVOFF,CMDR F,RVOFF] [RVOFF]
      "'BGAD
1050 L$(39)="[RVOFF,CMDR K,RVOFF]
     [RVOFF,CMDR B,RVOFF,CMDR V,RVOFF]
      "'BGFF
1060 L$(40)="[RVS,CMDR C,RVOFF,CMDR I,
     RVOFF,CMDR K,RVOFF,CMDR V,RVOFF]
      "'BGWG
1070 REM ''BBGA
1080 L$(41)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BGNF
1090 L$(42)="[RVOFF] [RVOFF,
     SHFT POUND,RVOFF] [RVOFF] [RVOFF]
      "'BGAH
1100 L$(43)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGNY
1110 L$(44)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGOA
1120 L$(45)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGPB
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1130 REM ('BBHW
1140 L$(46)="[RVOFF] [RVOFF] [RVS,
     SHFT POUND,RVOFF,SHFT POUND,
     RVOFF] "'BGND
1150 L$(47)="[RVOFF] [RVOFF] [RVS]
     [RVOFF] [RVOFF] "'BGTD
1160 L$(48)="[RVOFF] [RVOFF] [RVS]
     [RVOFF] [RVOFF] "'BGUE
1170 L$(49)="[RVOFF] [RVOFF] [RVS]
     [RVOFF] [RVOFF] "'BGVF
1180 L$(50)="[RVOFF] [RVOFF] [RVOFF,
     CMDR *,RVS,CMDR *,RVOFF] "'BGKI
1190 REM )'BBID
1200 L$(51)="[RVOFF,CMDR *,RVS,CMDR *,
     RVOFF] [RVOFF] [RVOFF] "'BGLB
1210 L$(52)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BGPA
1220 L$(53)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BGQB
1230 L$(54)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BGRC
1240 L$(55)="[RVS,SHFT POUND,RVOFF,
     SHFT POUND,RVOFF] [RVOFF] [RVOFF]
      "'BGNE
1250 REM *'BBJA
1260 L$(56)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGRG
1270 L$(57)="[RVOFF] [RVOFF,CMDR F,
     RVOFF,CMDR K,RVOFF,CMDR F,RVOFF]
      "'BGYJ
1280 L$(58)="[RVOFF,CMDR D,RVS,CMDR V,
     RVS] [RVOFF,CMDR I,RVOFF] "'BGMJ
1290 L$(59)="[RVOFF] [RVS,CMDR B,RVS,
     CMDR D,RVOFF,CMDR F,RVOFF] "'BGNK
1300 L$(60)="[RVOFF] [RVOFF] [RVOFF,
     CMDR V,RVOFF] [RVOFF] "'BGVB
1310 REM +'BBKW
1320 L$(61)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGND
1330 L$(62)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BGQD
1340 L$(63)="[RVS] [RVS] [RVS] [RVOFF]
      [RVOFF] "'BGPD
1350 L$(64)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BGSF
1360 L$(65)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGRH
1370 REM ,'BBLD
1380 L$(66)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGSJ
1390 L$(67)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGTK
1400 L$(68)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGUC
1410 L$(69)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BGXC
1420 L$(70)="[RVOFF] [RVOFF,
     SHFT POUND,RVOFF] [RVOFF] [RVOFF]
      "'BGBE
1430 REM -'BBMA
1440 L$(71)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGOG
1450 L$(72)="[RVOFF] [RVOFF] [RVOFF]
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     [RVOFF] [RVOFF] "'BGPH
1460 L$(73)="[RVS] [RVS] [RVS] [RVOFF]
      [RVOFF] "'BGQG
1470 L$(74)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGRJ
1480 L$(75)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGSK
1490 REM .'BBNG
1500 L$(76)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGTD
1510 L$(77)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGUE
1520 L$(78)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGVF
1530 L$(79)="[RVOFF] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGWG
1540 L$(80)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BGQG
1550 REM /'BBOD
1560 L$(81)="[RVOFF] [RVOFF] [RVOFF]
     [RVS,SHFT POUND,RVOFF] "'BGYJ
1570 L$(82)="[RVOFF] [RVOFF] [RVS,
     SHFT POUND,RVOFF,SHFT POUND,
     RVOFF] "'BGNK
1580 L$(83)="[RVOFF] [RVS,SHFT POUND,
     RVOFF,SHFT POUND,RVOFF] [RVOFF]
      "'BGOL
1590 L$(84)="[RVS,SHFT POUND,RVOFF,
     SHFT POUND,RVOFF] [RVOFF] [RVOFF]
      "'BGPM
1600 L$(85)="[RVOFF,SHFT POUND,RVOFF]
      [RVOFF] [RVOFF] [RVOFF] "'BGHE
1610 REM 0'BBPA
1620 L$(86)="[RVS] [RVS] [RVS] [RVS]
     [RVOFF] "'BGQE
1630 L$(87)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BGTG
1640 L$(88)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BGUH
1650 L$(89)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BGVI
1660 L$(90)="[RVS] [RVS] [RVS] [RVS]
     [RVOFF] "'BGLI
1670 REM 1'BBQG
1680 L$(91)="[RVOFF] [RVS] [RVS]
     [RVOFF] [RVOFF] "'BGOL
1690 L$(92)="[RVOFF] [RVOFF] [RVS]
     [RVOFF] [RVOFF] "'BGTM
1700 L$(93)="[RVOFF] [RVOFF] [RVS]
     [RVOFF] [RVOFF] "'BGUE
1710 L$(94)="[RVOFF] [RVOFF] [RVS]
     [RVOFF] [RVOFF] "'BGVF
1720 L$(95)="[RVOFF] [RVS] [RVS] [RVS]
      [RVOFF] "'BGUF
1730 REM 2'BBRD
1740 L$(96)="[RVS] [RVS] [RVS] [RVS]
     [RVOFF] "'BGRH
1750 L$(97)="[RVOFF] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BGYJ
1760 L$(98)="[RVS] [RVS] [RVS] [RVS]
     [RVOFF] "'BGTJ
1770 L$(99)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BGBL
1780 L$(100)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHBL
1790 REM 3'BBSJ
1800 L$(101)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHCE
1810 L$(102)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHEH
1820 L$(103)="[RVOFF] [RVS] [RVS]
     [RVS] [RVOFF] "'BHDH
1830 L$(104)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHGJ
1840 L$(105)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHGI
1850 REM 4'BBTG
1860 L$(106)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHJL
1870 L$(107)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHKM
1880 L$(108)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHJM
1890 L$(109)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHLP
1900 L$(110)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHDH
1910 REM 5'BBUD
1920 L$(111)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHDH
1930 L$(112)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHFK
1940 L$(113)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHFJ
1950 L$(114)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHHM
1960 L$(115)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHHL
1970 REM 6'BBVJ
1980 L$(116)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHIN
1990 L$(117)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHKQ
2000 L$(118)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHKW
2010 L$(119)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHNY
2020 L$(120)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHDY
2030 REM 7'BBWW
2040 L$(121)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHEB
2050 L$(122)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHGE
2060 L$(123)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHHF
2070 L$(124)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHIG
2080 L$(125)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHJH
2090 REM 8'BBXD
2100 L$(126)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHJX
2110 L$(127)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHMA
2120 L$(128)="[RVS] [RVS] [RVS] [RVS]
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     [RVOFF] "'BHLA
2130 L$(129)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHOC
2140 L$(130)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHEC
2150 REM 9'BBYA
2160 L$(131)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHFE
2170 L$(132)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHIG
2180 L$(133)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHHG
2190 L$(134)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHJJ
2200 L$(135)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHJY
2210 REM :'BBAW
2220 L$(136)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHOD
2230 L$(137)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHQF
2240 L$(138)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHQF
2250 L$(139)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHSH
2260 L$(140)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHJH
2270 REM ;'BBBD
2280 L$(141)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHKJ
2290 L$(142)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BHIK
2300 L$(143)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHMC
2310 L$(144)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BHKD
2320 L$(145)="[RVOFF] [RVOFF,
     SHFT POUND,RVOFF] [RVOFF] [RVOFF]
      "'BHWF
2330 REM <'BBCA
2340 L$(146)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHPG
2350 L$(147)="[RVOFF] [RVS,SHFT POUND,
     RVOFF,SHFT POUND,RVOFF] [RVOFF]
      "'BHHI
2360 L$(148)="[RVS,SHFT POUND,RVOFF,
     SHFT POUND,RVOFF] [RVOFF] [RVOFF]
      "'BHIJ
2370 L$(149)="[RVOFF,CMDR *,RVS,
     CMDR *,RVOFF] [RVOFF] [RVOFF]
      "'BHRK
2380 L$(150)="[RVOFF] [RVOFF,CMDR *,
     RVS,CMDR *,RVOFF] [RVOFF] "'BHJL
2390 REM ='BBDG
2400 L$(151)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHLD
2410 L$(152)="[RVS,CMDR K,RVS] [RVS]
     [RVOFF,CMDR K,RVOFF] "'BHLE
2420 L$(153)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHNF
2430 L$(154)="[RVS,CMDR K,RVS] [RVS]
     [RVOFF,CMDR K,RVOFF] "'BHNG
2440 L$(155)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHPH
2450 REM <'BBCD
2460 L$(156)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHQJ
2470 L$(157)="[RVOFF] [RVOFF,CMDR *,
     RVS,CMDR *,RVOFF] [RVOFF] "'BHQL
2480 L$(158)="[RVOFF] [RVOFF] [RVOFF,
     CMDR *,RVS,CMDR *,RVOFF] "'BHRM
2490 L$(159)="[RVOFF] [RVOFF] [RVS,
     SHFT POUND,RVOFF,SHFT POUND,
     RVOFF] "'BHKN
2500 L$(160)="[RVOFF] [RVS,SHFT POUND,
     RVOFF,SHFT POUND,RVOFF] [RVOFF]
      "'BHCF
2510 REM ?'BBFA
2520 L$(161)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHIE
2530 L$(162)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHKH
2540 L$(163)="[RVOFF] [RVS] [RVS]
     [RVS] [RVOFF] "'BHJH
2550 L$(164)="[RVOFF] [RVS,CMDR I,
     RVOFF] [RVOFF] [RVOFF] "'BHRJ
2560 L$(165)="[RVOFF] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BHNK
2570 REM @'BBGG
2580 L$(166)="[RVS,CMDR D,RVS,CMDR I,
     RVS,CMDR I,RVS,CMDR F,RVOFF]
      "'BHKM
2590 L$(167)="[RVOFF,CMDR K,RVOFF,
     CMDR I,RVOFF,CMDR I,RVS,CMDR K,
     RVOFF] "'BHYP
2600 L$(168)="[RVOFF,CMDR K,RVOFF,
     CMDR K,RVS,CMDR K,RVS,CMDR K,
     RVOFF] "'BHAG
2610 L$(169)="[RVOFF,CMDR K,RVS,
     CMDR I,RVS,CMDR F,RVS,CMDR V,
     RVOFF] "'BHDH
2620 L$(170)="[RVS,CMDR C,RVOFF,
     CMDR I,RVOFF,CMDR I,RVOFF,CMDR I
     RVOFF] "'BHVJ
2630 REM A'BBHD
2640 L$(171)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHJH
2650 L$(172)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHMJ
2660 L$(173)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHLJ
2670 L$(174)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHOL
2680 L$(175)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHPM
2690 REM B'BBIJ
2700 L$(176)="[RVS] [RVS] [RVS] [RVS,
     CMDR *,RVOFF] "'BHAF
2710 L$(177)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHRG
2720 L$(178)="[RVS] [RVS] [RVS]
     [RVOFF,CMDR K,RVOFF] "'BHTH
2730 L$(179)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHTI
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2740 L$(180)="[RVS] [RVS] [RVS]
     [RVOFF,SHFT POUND,RVOFF] "'BHUJ
2750 REM C'BBJG
2760 L$(181)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHKK
2770 L$(182)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHMN
2780 L$(183)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHNO
2790 L$(184)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHOP
2800 L$(185)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHOF
2810 REM D'BBKD
2820 L$(186)="[RVS] [RVS] [RVS] [RVS,
     CMDR *,RVOFF] "'BHBI
2830 L$(187)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHSJ
2840 L$(188)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHTK
2850 L$(189)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHUL
2860 L$(190)="[RVS] [RVS] [RVS]
     [RVOFF,SHFT POUND,RVOFF] "'BHVM
2870 REM E'BBLJ
2880 L$(191)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHLN
2890 L$(192)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHNQ
2900 L$(193)="[RVS] [RVS] [RVS]
     [RVOFF] [RVOFF] "'BHMH
2910 L$(194)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHPJ
2920 L$(195)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHPI
2930 REM F'BBMG
2940 L$(196)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHQK
2950 L$(197)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHSN
2960 L$(198)="[RVS] [RVS] [RVS]
     [RVOFF] [RVOFF] "'BHRN
2970 L$(199)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHUP
2980 L$(200)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHDQ
2990 REM G'BBNM
3000 L$(201)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHDX
3010 L$(202)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHFB
3020 L$(203)="[RVS] [RVOFF] [RVS]
     [RVS] [RVOFF] "'BHEB
3030 L$(204)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHIC
3040 L$(205)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHHC
3050 REM H'BBOA
3060 L$(206)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHKF
3070 L$(207)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHLG
3080 L$(208)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHKG
3090 L$(209)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHNI
3100 L$(210)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHFA
3110 REM I'BBPW
3120 L$(211)="[RVOFF] [RVS] [RVS]
     [RVOFF] [RVOFF] "'BHGC
3130 L$(212)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHKF
3140 L$(213)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHLG
3150 L$(214)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHMH
3160 L$(215)="[RVOFF] [RVS] [RVS]
     [RVOFF] [RVOFF] "'BHKG
3170 REM J'BBQD
3180 L$(216)="[RVOFF] [RVOFF] [RVS]
     [RVS] [RVOFF] "'BHLI
3190 L$(217)="[RVOFF] [RVOFF] [RVS,
     CMDR K,RVOFF,CMDR K,RVOFF] "'BHPL
3200 L$(218)="[RVOFF] [RVOFF] [RVS,
     CMDR K,RVOFF,CMDR K,RVOFF] "'BHQD
3210 L$(219)="[RVS] [RVOFF] [RVS,
     CMDR K,RVOFF,CMDR K,RVOFF] "'BHSD
3220 L$(220)="[RVS] [RVS] [RVS]
     [RVOFF,CMDR K,RVOFF] "'BHHD
3230 REM K'BBRA
3240 L$(221)="[RVS] [RVOFF] [RVS,
     SHFT POUND,RVOFF,SHFT POUND,
     RVOFF] "'BHCG
3250 L$(222)="[RVS] [RVS,SHFT POUND,
     RVOFF,SHFT POUND,RVOFF] [RVOFF]
      "'BHDH
3260 L$(223)="[RVS] [RVS] [RVOFF]
     [RVOFF] [RVOFF] "'BHJH
3270 L$(224)="[RVS] [RVOFF,CMDR *,RVS,
     CMDR *,RVOFF] [RVOFF] "'BHIK
3280 L$(225)="[RVS] [RVOFF] [RVOFF,
     CMDR *,RVS,CMDR *,RVOFF] "'BHJL
3290 REM L'BBSG
3300 L$(226)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHLD
3310 L$(227)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHME
3320 L$(228)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHNF
3330 L$(229)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHOG
3340 L$(230)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHFF
3350 REM M'BBTD
3360 L$(231)="[RVS] [RVS,CMDR *,RVS,
     SHFT POUND,RVS] [RVOFF] "'BHFI
3370 L$(232)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHHI
3380 L$(233)="[RVS] [RVOFF,CMDR *,
     RVOFF,SHFT POUND,RVS] [RVOFF]"'BHJL
3390 L$(234)="[RVS] [RVOFF] [RVOFF]
```

Continued next page

```
     [RVS] [RVOFF] "'BHLL
3400 L$(235)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHMD
3410 REM N'BBUA
3420 L$(236)="[RVS] [RVS,CMDR *,RVOFF]
      [RVS] [RVOFF] "'BHBF
3430 L$(237)="[RVS] [RVS] [RVS,CMDR *,
     RVS] [RVOFF] "'BHXG
3440 L$(238)="[RVS] [RVOFF,CMDR *,RVS]
      [RVS] [RVOFF] "'BHDH
3450 L$(239)="[RVS] [RVOFF] [RVOFF,
     CMDR *,RVS] [RVOFF] "'BHCJ
3460 L$(240)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHIJ
3470 REM O'BBVG
3480 L$(241)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHHK
3490 L$(242)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHKM
3500 L$(243)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHLE
3510 L$(244)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHMF
3520 L$(245)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHLF
3530 REM P'BBWD
3540 L$(246)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHMH
3550 L$(247)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHPJ
3560 L$(248)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHOJ
3570 L$(249)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHQM
3580 L$(250)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHIN
3590 REM Q'BBXJ
3600 L$(251)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHIE
3610 L$(252)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHLG
3620 L$(253)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHMH
3630 L$(254)="[RVS] [RVOFF] [RVS,
     CMDR N,RVS] [RVOFF] "'BHXI
3640 L$(255)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHMI
3650 REM R'BBYG
3660 L$(256)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHNK
3670 L$(257)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHQM
3680 L$(258)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHPM
3690 L$(259)="[RVS] [RVOFF,CMDR *,RVS,
     CMDR *,RVOFF] [RVOFF] "'BHQQ
3700 L$(260)="[RVS] [RVOFF] [RVOFF,
     CMDR *,RVS,CMDR *,RVOFF] "'BHII
3710 REM S'BBAD
3720 L$(261)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHJH
3730 L$(262)="[RVS] [RVOFF] [RVOFF]
     [RVOFF] [RVOFF] "'BHLK
3740 L$(263)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHLJ
3750 L$(264)="[RVOFF] [RVOFF] [RVOFF]
      [RVS] [RVOFF] "'BHNM
3760 L$(265)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHNL
3770 REM T'BBBJ
3780 L$(266)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHON
3790 L$(267)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHUR
3800 L$(268)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHVJ
3810 L$(269)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHWK
3820 L$(270)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHOL
3830 REM U'BBCG
3840 L$(271)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHML
3850 L$(272)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHNM
3860 L$(273)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHON
3870 L$(274)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHPO
3880 L$(275)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHOO
3890 REM V'BBDM
3900 L$(276)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHRI
3910 L$(277)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHSJ
3920 L$(278)="[RVS] [RVS,CMDR *,RVS,
     SHFT POUND,RVS] [RVOFF] "'BHQK
3930 L$(279)="[RVOFF,CMDR *,RVS] [RVS]
      [RVOFF,SHFT POUND,RVOFF] "'BHTM
3940 L$(280)="[RVOFF] [RVOFF,CMDR *,
     RVOFF,SHFT POUND,RVOFF] [RVOFF]
      "'BHNO
3950 REM W'BBEJ
3960 L$(281)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHNO
3970 L$(282)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHOP
3980 L$(283)="[RVS] [RVS,SHFT POUND,
     RVS,CMDR *,RVS] [RVOFF] "'BHMQ
3990 L$(284)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHOQ
4000 L$(285)="[RVOFF,CMDR *,RVOFF,
     SHFT POUND,RVOFF,CMDR *,RVOFF,
     SHFT POUND,RVOFF] "'BHLE
4010 REM X'BBFW
4020 L$(286)="[RVS,CMDR *,RVOFF]
     [RVOFF] [RVS,SHFT POUND,RVOFF]
      "'BHRD
4030 L$(287)="[RVOFF,CMDR *,RVS,
     CMDR *,RVS,SHFT POUND,RVOFF,
     SHFT POUND,RVOFF] "'BHLG
```

```
4040 L$(288)="[RVOFF] [RVS] [RVS]
     [RVOFF] [RVOFF] "'BHUE
4050 L$(289)="[RVS,SHFT POUND,RVOFF,
     SHFT POUND,RVOFF,CMDR *,RVS,
     CMDR *,RVOFF] "'BHNI
4060 L$(290)="[RVOFF,SHFT POUND,RVOFF]
      [RVOFF] [RVOFF,CMDR *,RVOFF]
      "'BHOI
4070 REM Y'BBGD
4080 L$(291)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHOI
4090 L$(292)="[RVS] [RVOFF] [RVOFF]
     [RVS] [RVOFF] "'BHPJ
4100 L$(293)="[RVOFF,CMDR *,RVS] [RVS]
      [RVOFF,SHFT POUND,RVOFF] "'BHPC
4110 L$(294)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHUE
4120 L$(295)="[RVOFF] [RVS,CMDR K,
     RVOFF,CMDR K,RVOFF] [RVOFF]
      "'BHVF
4130 REM Z'BBHA
4140 L$(296)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHRE
4150 L$(297)="[RVOFF] [RVOFF] [RVS,
     SHFT POUND,RVOFF,SHFT POUND,
     RVOFF] "'BHNI
4160 L$(298)="[RVOFF] [RVS,SHFT POUND,
     RVOFF,SHFT POUND,RVOFF] [RVOFF]
      "'BHOJ
4170 L$(299)="[RVS,SHFT POUND,RVOFF,
     SHFT POUND,RVOFF] [RVOFF] [RVOFF]
      "'BHPK
4180 L$(300)="[RVS] [RVS] [RVS] [RVS]
      [RVOFF] "'BHDI
4190 REM [ HAPPY FACE'BKWJ
4200 L$(301)="[RVS,CMDR D,RVS,CMDR I,
     RVS,CMDR I,RVS,CMDR I,RVS,CMDR F]
     "'BHDD
4210 L$(302)="[RVOFF,CMDR K,RVOFF,
     SHFT Q,RVOFF] [RVOFF,SHFT Q,RVS,
     CMDR K]"'BHJG
4220 L$(303)="[RVOFF,CMDR K,RVOFF]
     [RVOFF,CMDR E,RVOFF] [RVS,CMDR K]
     "'BHGG
4230 L$(304)="[RVOFF,CMDR K,RVS,
     CMDR C,RVOFF,CMDR I,RVS,CMDR V,
     RVS,CMDR K]"'BHAH
4240 L$(305)="[RVS,CMDR C,RVOFF,
     CMDR I,RVOFF,CMDR I,RVOFF,CMDR I,
     RVS,CMDR V]"'BHBJ
4250 REM [ENG. POUND] BOAT'BFRF
4260 L$(306)="[RVOFF] [RVOFF,CMDR P,
     RVOFF] [RVOFF] [RVOFF] "'BHBK
4270 L$(307)="[RVOFF] [RVS,SHFT POUND,
     RVOFF] [RVOFF] [RVOFF] "'BHXK
4280 L$(308)="[RVS,SHFT POUND,RVS]
     [RVOFF] [RVOFF] [RVOFF] "'BHVL
4290 L$(309)="[RVOFF,CMDR O,RVOFF,
     CMDR M,RVOFF] [RVOFF,SHFT X,
     RVOFF,CMDR O]"'BHDP
4300 L$(310)="[RVOFF,CMDR *,RVS] [RVS]
      [RVS] [RVOFF,SHFT POUND]"'BHBE
4310 REM ] TRAIN CAR'BJND
4320 L$(311)="[RVOFF] [RVOFF] [RVOFF,
     CMDR M,RVOFF,SHFT O,RVOFF] "'BHPH
4330 L$(312)="[RVS,CMDR K,RVS,CMDR I,
     RVS,CMDR I,RVS,CMDR I,RVOFF,
     CMDR K]"'BHRI
4340 L$(313)="[RVS,CMDR K,RVOFF,
     SHFT ^,RVOFF] [RVOFF,SHFT ^,
     RVOFF,CMDR K]"'BHDK
4350 L$(314)="[RVS,CMDR F,RVOFF,
     CMDR I,RVOFF,CMDR I,RVOFF,CMDR I,
     RVS,CMDR D]"'BHHL
4360 L$(315)="[RVOFF,SHFT J,RVOFF,
     SHFT K,RVOFF] [RVOFF,SHFT J,
     RVOFF,SHFT K]"'BHGN
4370 REM ^ MAN'BEAH
4380 L$(316)="[RVOFF] [RVS,CMDR B,RVS,
     CMDR D,RVOFF,CMDR F,RVOFF] "'BHHN
4390 L$(317)="[RVOFF] [RVS,CMDR F,RVS]
      [RVOFF,CMDR V,RVOFF] "'BHWN
4400 L$(318)="[RVOFF] [RVOFF,CMDR I,
     RVS,CMDR C,RVOFF,CMDR F,RVOFF]
      "'BHAG
4410 L$(319)="[RVOFF,CMDR C,RVS,
     CMDR K,RVS] [RVOFF,CMDR C,RVOFF]
      "'BHWH
4420 L$(320)="[RVOFF] [RVS,CMDR V,RVS,
     CMDR K,RVOFF,CMDR F,RVOFF] "'BHPI
4430 REM [BACK ARROW] ARROWS'BHDF
4440 L$(321)="[RVS,SHFT POUND,RVOFF,
     CMDR P,RVOFF,CMDR P,RVOFF,CMDR F,
     RVOFF] "'BHBL
4450 L$(322)="[RVOFF,CMDR *,RVOFF,
     CMDR Y,RVOFF,CMDR Y,RVOFF,CMDR V,
     RVOFF] "'BHYN
4460 L$(323)="[RVOFF] [RVOFF] [RVOFF]
      [RVOFF] [RVOFF] "'BHML
4470 L$(324)="[RVS,SHFT POUND,RVOFF,
     CMDR P,RVOFF,CMDR P,RVOFF,CMDR F,
     RVOFF] "'BHEO
4480 L$(325)="[RVOFF,CMDR *,RVOFF,
     CMDR Y,RVOFF,CMDR Y,RVOFF,CMDR V,
     RVOFF] "'BHBO
4490 GOTO 30'BCKJ
4500 "[SPACE5]STANDBY CHARACTERS"'AAWG
4510 "[SPACE4,CMDR U20]"'AASQ
4520 REM [BACK ARROW] MAD FACE'BIGF
4530 L$(321)="[RVS,CMDR D,RVS,CMDR I,
     RVS,CMDR I,RVS,CMDR I,RVS,CMDR F]
     "'BHFJ
4540 L$(322)="[RVOFF,CMDR K,RVOFF,
     SHFT M,RVOFF] [RVOFF,SHFT N,RVS,
     CMDR K]"'BHEM
4550 L$(323)="[RVOFF,CMDR K,RVOFF,
     SHFT W,RVOFF] [RVOFF,SHFT W,RVS,
     CMDR K]"'BHYN
4560 L$(324)="[RVOFF,CMDR K,RVOFF,
     SHFT U,RVOFF,SHFT *,RVOFF,SHFT I,
     RVS,CMDR K]"'BHPP
4570 L$(325)="[RVS,CMDR C,RVOFF,
     CMDR I,RVOFF,CMDR I,RVOFF,CMDR I,
     RVS,CMDR V]"'BHDP
4580 GOTO 30'BCKJ
```

END

BY STEPHEN S. LEVEN

Text Line Processor For the Commodore 64 and VIC 20 Part 2

Last issue Steve and his neighbor, Aaron, created a mini word processor. This issue they modify it to make it easier to use. For your reference, the original program, "Line Writer," appears on page 109.

While Aaron was working (playing?) on the 64, I thought about the exercise we had just been through. What we had created, (and programming is a creative, interactive experience between the user, programmer, and the computer) was the most basic of word processing programs—a text line processor. A line of data can be typed, deleted, and typed over and over again, until the user is satisfied, then printed when the RETURN key is hit.

I saved the "Line Writer" program and after Aaron left, I made a few changes to make it more useful to me. The first was to add lowercase characters to both the TV screen and the printout. Printing a CHR$(14) to the screen enables (turns on) the second character set (upper and lower case, rather than upper case with full graphics). Adding the secondary address 7 to the OPEN statement causes the 1525 printer to also go into upper/lowercase mode. See lines 3 and 30 in the final Text Line Processor program. (Be sure to hit RUN/STOP to end the program and get back to the flashing cursor.)

Run the program and check out the difference from the previous version. To get uppercase letters, simply hold down the SHIFT key while typing the letter.

How About a Cursor

The next change was to add a cursor. A flashing cursor is tricky, so I added a seldom used graphics symbol: the checkerboard—CHR$(166). The method is to print the cursor, then when a character is typed for the GET statement, print that character over the cursor, and print a new cursor. This involves also printing a CHR$(157), which is a cursor left, so that everything will be in the right position. I added line 15 and changed line 29, as shown in Listing 1, to produce the cursor. (Don't forget the semicolons—one in each line).

Create a simple word processor while you learn basic programming techniques.

The 1525 printer can print 80 normal characters across an 8½ inch page, or 40 characters which are twice as wide (called enhanced printing). We can select this option by sending the printer a CHR$(14) for enhanced printing and a CHR$(15) for normal printing. We can add a little menu to the beginning of the program to make the selection. We can also add some pokes so the Commodore 64 will look like the VIC screen: blue border, white background and blue characters. This is all accomplished by adding lines 4 through 11 and a change in line 40, as in Listing 2.

(*Note:* If you do not have a 1525 printer, either replace the CHR$(14) and CHR$(15) with the appropriate control codes for your printer or do not make the changes to line 40 nor type lines 5 through 11 at all.)

The Quote Mode

Whenever a quote mark ("), CHR$(34), is typed, the VIC 20 and Commodore 64 go into what is known as "quote mode." In this mode, any cursor movements or control characters are displayed as reverse graphics symbols. This is no different under program control. If you type one quote mark (") as part of your text, the display starts acting funny, and when you hit RETURN, the printout has an extra character on the end. Try it!

When a quote mark is printed to the screen or printer, the value of memory location 212 is changed from its normal zero to something else. When a second quote mark is printed, this location is returned to value zero, indicating that quote mode is over. If, after we PRINT a quote mark to either the screen or printer, we reset location 212 to zero, we can permanently keep the computer out of quote mode. To accomplish this, add line 19 and change lines 29 and 40, as shown in the final Text Line Processor program.

More Enhancements

Since this program can be used on the VIC 20 as well as on the Commodore 64, it would be nice to have a marker at the screen location showing where the end of the printed line would be. This would be the fortieth position for the double-width printout, and the eightieth position for the single-width printout. We will use the TAB function to get to these locations, so we must subtract one from the print position since these positions are numbered zero to 39 or zero to 79 in the computer. I chose CHR$(171) for the end-of-text-area symbol, but you may choose any one you want. Just remember that it must be one of the "left-side graphics" characters—one that is typed by holding down the Commodore logo key. To add the end-of-text-area marker, change lines 8 and 9 and add line 14 so they look like the lines in the final Text Line Processor. (Don't forget the semicolon in two places in line 14):

(*Note:* If you get other than 80 characters across the page in the normal printing mode, make the appropriate adjustments to the value of M in lines 8 and 9.)

Another nice feature would be to blank out the cursor and end-of-text-area marker while the printer is printing. Changing line 22 (see the final program) will take care of that.

(*Note:* You *must* leave one blank space between the quote marks in both places in this line.)

The color of the prompt "TYPE:" can be made different from the actual text by adding some color commands within the PRINT statement in line 12 (see the final program).

Notice that we also made the prompt print with a capital T by using the shifted T in the statement.

By adding Line 21 we can make a simple program change so that pressing the F1 key will get us back to the mini-menu, which will allow us to change print width or end the program.

We can also permit the CRSR LEFT key to have the same effect as the DELETE key—removing an erroneous entry. The CRSR LEFT however, will not move the end-of-text-area marker, as does the DELETE key in some instances. I added lines 23, 25, 26 and 28 to cause this to happen.

The final touches included the addition of REM statements to help identify the program and the elimination of all control characters except CRSR LEFT and DELETE from having any effect on the text data. You'll find these in lines 1, 2 and 24 in the final program.

Summary of the Programming Process

And that's all there is to it! The process we went through is typical of most programming sessions. The first step is to come up with a set of goals for the program. Next, the exact flow of the program is listed. In our case, we simply made a six-step chart. However, in many cases, a block diagram must be sketched out in which each block represents a single step in the program and all blocks are connected with arrows indicating program flow. Such a diagram is called a flow chart, and is an important part of structured programming in any language.

Next, program lines are written that accomplish each of the tasks in the flow chart. Line numbers should be spaced to allow insertion of other lines later. Once the main part of the program is working, enhancements are usually added. Usually, the enhancements can take longer to add than the main part of the program. That is why computer programmers are sometimes called "hackers." They hack away at minute details of a program until it is, in their opinion, "perfect." In our case, the program tripled in length when we added the enhancements. And the enhancements took about ten times as long to work out as did the original program!

The final step in programming is program use. Now you can use your "Line Writer" to write those long overdue letters to friends and family. That's what Aaron and I did. C

Note: Those using the VIC 20 should delete the apostrophe and the four letters at the end of each program line in the various listings.

Line Writer

```
12 PRINT"TYPE:":B$="": REM B$ STRING
   IS CLEARED'DVDH
20 GET A$:IF A$=""THEN 20
   : REM GET ONE TYPED CHARACTER'FDLI
22 IF A$=CHR$(13)THEN 30
   : REM THE <RETURN> KEY'FXVJ
27 B$=B$+A$: REM ADD A$ TO END OF B$
   STRING'DCHN
29 PRINT A$;:GOTO 20: REM GET NEXT
   CHARACTER'DXKO
30 OPEN 1,4: REM DATA CHANNEL FOR
   PRINTER'CAXH
40 PRINT#1,B$:PRINT: REM PRINT DATA,
    GO TO NEXT LINE'DDFJ
50 CLOSE 1: REM CLOSE DATA
   CHANNEL'CSJH
60 GOTO 12: REM GO BACK TO STEP 1'CQHH
```

Listing 1.

```
15 PRINT CHR$(166);: REM CURSOR'DNWH

29 PRINT CHR$(157)A$CHR$(166);
   :GOTO 20'EQYM
```

Listing 2.

```
 4 POKE 53280,6:POKE 53281,1
   : REM FOR COMMODORE 64 ONLY'DJTM
 5 PRINT"[BLUE,CLEAR,DOWN3,SHFT E]NTER
   [DOWN]":PRINT" [RVS]1[RVOFF,SPACE2]
   SINGLE WIDTH PRINTOUT"'CBHO
 6 PRINT" [RVS]2[RVOFF,SPACE2]
   DOUBLE WIDTH PRINTOUT"
   :PRINT" [RVS]3[RVOFF,SPACE2]
   END"'CBBO
 7 GET N$:IF N$=""THEN 7'EGRI
 8 IF VAL(N$)=1 THEN N=15:GOTO 12'GLPM
 9 IF VAL(N$)=2 THEN N=14:GOTO 12'GLPN
10 IF VAL(N$)=3 THEN PRINT"[CLEAR]
   "CHR$(142):END'HLCE
11 GOTO 5'BBOX

40 PRINT#1,CHR$(N)B$CHR$(15)
   :PRINT'EMSF
```

Text Line Processor

```
 2 REM BY STEPHEN S. LEVEN,
    AUGUST 1983'BCWI
 3 PRINT CHR$(14): REM UPPER/LOWER
   CASE SET'DXRJ
 4 POKE 53280,6:POKE 53281,1
   : REM FOR COMMODORE 64 ONLY'DJTM
 5 PRINT"[BLUE,CLEAR,DOWN3,SHFT E]NTER
   [DOWN]":PRINT" [RVS]1[RVOFF,SPACE2]
   SINGLE WIDTH PRINTOUT"'CBHO
 6 PRINT" [RVS]2[RVOFF,SPACE2]
   DOUBLE WIDTH PRINTOUT"
   :PRINT" [RVS]3[RVOFF,SPACE2]
   END"'CBBO
 7 GET N$:IF N$=""THEN 7'EGRI
 8 IF VAL(N$)=1 THEN N=15:M=79
   :GOTO 12'HPJN
 9 IF VAL(N$)=2 THEN N=14:M=39
   :GOTO 12'HPFO
10 IF VAL(N$)=3 THEN PRINT"[CLEAR]
   "CHR$(142):END'HLCE
11 GOTO 5'BBOX
12 PRINT"[GREEN,SHFT T]YPE:[BLUE]"
   :B$=""'CDPD
14 PRINT TAB(M)CHR$(171);
   :FOR J=1 TO M+1:PRINT CHR$(157);
   :NEXT'KVIL
```

Continued next page

Computers For The Blind

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COMPUTER TUTOR

```
15 PRINT CHR$(166);: REM CURSOR'DNWH
19 IF A$=CHR$(34)THEN POKE 212,0'FLEL
20 GET A$:IF A$=""THEN 20
   : REM GET ONE TYPED CHARACTER'FDLI
21 IF A$=CHR$(133)THEN 5'EITD
22 IF A$=CHR$(13)THEN PRINT
   CHR$(157)" ";TAB(M)" "CHR$(145);
   :GOTO 30'JXKK
23 IF A$=CHR$(20)OR A$=CHR$(157)THEN
   A$=CHR$(157):GOTO 25'KXCM
24 IF ASC(A$)<32 OR(ASC(A$)>127 AND
   ASC(A$)<160)THEN 20'KYAN
25 IF B$=""AND A$=CHR$(157)THEN
   20'GLNJ
26 IF A$=CHR$(157)THEN B$=LEFT$(B$,
   LEN(B$)-1):GOTO 28'JWRO
27 B$=B$+A$: REM ADD A$ TO END OF B$
   STRING'DCHN
28 IF A$=CHR$(157)THEN PRINT
   CHR$(157)" ";'GNQM
29 PRINT CHR$(157)A$CHR$(166);
   : GOTO 19'EQHM
30 OPEN 1,4,7: REM DATA CHANNEL FOR
   PRINTER'CCVH
40 PRINT#1,CHR$(N)B$;:PRINT#1
   :POKE 212,0:PRINT#1,CHR$(15);
   :PRINT'HAXJ
50 CLOSE 1: REM CLOSE DATA CHANNEL'CSJH
60 GOTO 12: REM GO BACK TO STEP 1'CQHH
```

END

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BY DAVID MALMBERG

List Processing in LOGO, Part 2

Let us continue the exploration of list processing in LOGO that began in the last issue of *Power/Play*. The previous issue's column introduced the basic concepts and terminology of lists and illustrated them with several examples including a "Buzz Word" sentence generator and a LOGO version of the game Mastermind. Now, we will turn to more serious LOGO applications by developing a diverse collection of powerful list-processing utilities including:

- Finding, deleting, inserting or replacing list elements
- Counting occurrences of specific elements
- Outputting sublists
- Performing set theory manipulations
- Sorting or scrambling the order of the elements
- Merging previously ordered lists

Part 3, in the next *Power/Play*, will conclude our discussion of lists by developing an "intelligent" data base with simple-to-use query capabilities.

BASIC List Operations

In Part 1, a LOGO list was defined as a collection of elements enclosed in square brackets. Each element can be a number, a word or another list. Here are several examples of how lists are used in LOGO: MAKE "DATE [JULY 4 1985] or REPEAT 4 [FORWARD 50 RIGHT 90] or MAKE "SET.OF.DIGITS [0 1 2 3 4 5 6 7 8 9]. A very important special case is a null or empty list which does not have any elements and is shown as [ ]. Part 1 also explained how to dissect or to combine lists and how to use LOGO's recursion capabilities to perform simple operations on lists such as calculating the total or average of a list of numbers.

The basic use of recursion in list operations can be seen best by considering an example such as the procedure in Listing 1, which will replace all occurrences of OLD with NEW in LIST.

Listing 1.

```
TO REPLACE.WORD :OLD :NEW :LIST
   IF :LIST = [] THEN OUTPUT []
   TEST :OLD = FIRST :LIST
   IFTRUE OUTPUT FPUT :NEW
      REPLACE.WORD :OLD :NEW ( BUTFIRST :LIST )
   IFFALSE OUTPUT FPUT FIRST :LIST
      REPLACE.WORD :OLD :NEW ( BUTFIRST :LIST )
END
```

The first statement in that listing is the name of the procedure with its inputs. The second line of the procedure tests if the current value of LIST is empty and, if it is, outputs an empty list. This logic is called a stopping condition because it causes the recursive calls to the procedure to stop as soon as the condition is TRUE. Most LOGO list-processing procedures will have a stopping condition similar to (and in many cases identical to) line two.

The third statement tests if the current first element of LIST is OLD, the element we wish to replace. If it is, line four outputs NEW followed by a recursive all to REPLACE.WORD with a new value for LIST—the old LIST without its first element. Line five is similar to line four except it does not output the NEW element because the condition in line three was not satisfied—instead it outputs the current first element followed by the same recursive call. The sixth and last line indicates the END of the procedure.

Let's walk through a typical LOGO call to such a procedure to see how recursion produces the desired effect. For example, if we had a statement to PRINT REPLACE.WORD "XX "TWO [ONE XX], the computer would print ONE TWO. When LOGO first encounters the call to REPLACE.WORD, it looks for the three entities following the procedure name and substitutes them for OLD, NEW and LIST respectively. Specifically, OLD becomes XX; NEW becomes TWO and LIST is initially set to [ONE XX].

Once inside the procedure, line two tests for the stopping condition—which is not met. Line three tests if the first element of [ONE XX], i.e., ONE, is equal to OLD (which is XX). Since it is not, line four is skipped and line five outputs the first element of LIST (or ONE) followed by the output of REPLACE.WORD :XX :TWO [XX]. This call to a procedure from within the same procedure is what is meant by the term recursion.

The second time through the procedure, line three is now TRUE since the first element of [XX] is XX. Line four then outputs TWO to replace XX followed by the output of REPLACE.WORD :XX :TWO [ ] for another recursive call.

The third (and last) time through the procedure, the stopping condition in line two is TRUE, since the input list is now empty, and the procedure produces its final output, [ ]. The output for the original PRINT statement call to the procedure is the "total" of all of the recursive call, i.e., ONE then TWO then [ ] — or ONE TWO — which is the final value printed.

The logic and format for the above procedure is very similar to a procedure to delete all occurrences of a WORD in a LIST as shown in Listing 2.

Listing 2.

```
TO DELETE.WORD :WORD :LIST
   IF :LIST = [] THEN OUTPUT []
   TEST :WORD = FIRST :LIST
   IFTRUE OUTPUT DELETE.WORD :WORD
      ( BUTFIRST :LIST )
   IFFALSE OUTPUT FPUT FIRST :LIST
      DELETE.WORD :WORD ( BUTFIRST :LIST )
END
```

This procedure was first presented in Part 1. To understand these routines fully, you should compare each corresponding statement of the two procedures until you can explain the reasons for the similarities and the differences.

List Position Operations

The procedures in Listings 1 and 2 operate on a specific word and either delete or replace all occurrences of that word within the list. Often we are not concerned with a word, but rather want to operate on an element in a specific position within the list. This is easy if we want to manipulate the first or last element, but to handle any other position we have to develop special procedures.

For example, the routine in Listing 3 will replace the element in POSITION within LIST with WORD. Notice that the third line in that listing executes a recursive call to the procedure each time, both counting POSITION down by one and truncating the first element of LIST until the current first element of LIST is the original poisition we wish to replace. At that point, the condition in line two is TRUE and the procedure's final output is WORD followed by the rest of LIST.

Listing 3.

```
TO REPLACE.POS :WORD :POSITION :LIST
   IF :POSITION = 1 THEN OUTPUT FPUT :WORD
      BUTFIRST :LIST
   OUTPUT FPUT FIRST :LIST REPLACE.POS
      :WORD ( :POSITION - 1 ) ( BUTFIRST :LIST )
END
```

An almost identical structure can be used to delete an element as shown in Listing 4. Similarly, we can write a routine to insert WORD at POSITION within LIST, as shown in Listing 5. A procedure related to the preceding three is one to find the position within LIST of a specific WORD. This procedure is shown in Listing 6.

Listing 4.

```
TO DELETE.POS :POSITION :LIST
   IF :POSITION = 1 THEN OUTPUT BUTFIRST :LIST
   OUTPUT FPUT FIRST :LIST DELETE.POS
      ( :POSITION - 1 ) ( BUTFIRST :LIST )
END
```

Listing 5.

```
TO INSERT.AT.POS :WORD :POSITION :LIST
   IF :POSITION = 1 THEN OUTPUT FPUT :WORD :LIST
   OUTPUT FPUT FIRST :LIST INSERT.AT.POS
      :WORD ( :POSITION - 1 ) ( BUTFIRST :LIST )
END
```

Listing 6.

```
TO FIND.POS :WORD :LIST
   IF :LIST = [] THEN OUTPUT 0
   IF NOT MEMBER? :WORD :LIST THEN OUTPUT 0
   IF :WORD = FIRST :LIST THEN OUTPUT 1
   OUTPUT 1 + FIND.POS :WORD ( BUTFIRST :LIST )
END
```

Notice that lines two and three in Listing 6 take care of the special cases when the list is empty or the WORD is not in the list and output a zero accordingly. Line four tests the first element and outputs a one if it is the WORD we are seeking. Line five adds one to the output and produces a recursive call after truncating the current first element of the list. If there is more than one occurrence of WORD in LIST, the procedure will output only the position of the first. To discover if there is more than one occurrence of WORD, we can use the procedure in Listing 7 to count them.

Listing 7.

```
TO OCCURRENCES :WORD :LIST
   IF NOT MEMBER? :WORD :LIST THEN OUTPUT 0
   IF :WORD = FIRST :LIST THEN OUTPUT 1 +
      OCCURRENCES :WORD ( BUTFIRST :LIST )
   OUTPUT OCCURRENCES :WORD ( BUTFIRST :LIST )
END
```

All the procedures presented so far are self-contained. But LOGO has the ability to combine procedures in very powerful ways. As an example, let's build a routine to scramble the order of a list. Such a routine could be used to shuffle a deck of cards, make an anagram out of a spelling word, or for similar applications that require a randomized list. First, we need to define an intermediate procedure to output a list after deleting the first occurrence of a specific word. This will be different from DELETE.WORD, which deletes all occurrences. To create our omitting procedure, we use the DELETE.POS and FIND.POS routines as shown in Listing 8.

Listing 8.

```
TO BUTWORD :WORD :LIST
   OUTPUT DELETE.POS (FIND.POS :WORD :LIST) :LIST
END
```

Remember that LOGO performs its operations working from the "inside" to the "outside" so FIND.POS is performed first. It finds the position of the first occurrence, which is then used by DELETE.POS as one of its inputs. After DELETE.POS returns its output, it is used again for the output of BUTWORD. This structure of "nesting" one routine's output as input to another routine is one of the primary expressions of the real power of LOGO.

Now we are ready to write the scrambling procedure. Look at Listing 9, where SELECT.RANDOM outputs a randomly selected element of LIST, as discussed in Part 1 in the last issue of *Power/Play*. Also see Listing 10.

Listing 9.

```
TO SCRAMBLE :LIST
   LOCAL "PICK
   IF :LIST = [] THEN OUTPUT []
   MAKE "PICK SELECT.RANDOM :LIST
   OUTPUT FPUT :PICK SCRAMBLE
      ( BUTWORD :PICK :LIST )
END
```

Listing 10.

```
TO SELECT.RANDOM :LIST
   OUTPUT ITEM ( 1 + RANDOM ( COUNT :LIST ) )
      :LIST
END
```

Sublist Operations

A very useful collection of list operations is those needed to output various subsets of a list. These routines are similar to the RIGHT$, LEFT$ and MID$ functions in BASIC that allow the programmer to manipulate substrings of string variables. For example, in LOGO it is often appropriate to delete the first POSITION elements but output the remainder of the LIST. A procedure to accomplish this is shown in Listing 11.

Listing 11.

```
TO DELETE.TO.POS :POSITION :LIST
   IF :POSITION = 0 THEN OUTPUT :LIST
   OUTPUT DELETE.TO.POS ( :POSITION - 1 )
      BUTFIRST :LIST
END
```

The related operation to output all of the elements from POSITION to the end of the LIST is easily defined using a call to the routine in Listing 11. This call is shown in Listing 12. Both of these procedures output the last part of the list. To output the elements in the front of the list, we would use the two procedures shown in Listing 13.

Listing 12.

```
TO OUTPUT.FROM.POS :POSITION :LIST
   OUTPUT DELETE.TO.POS ( :POSITION - 1 )
      :LIST
END
```

Listing 13.

```
TO DELETE.FROM.POS :POSITION :LIST
   TEST ( ( COUNT :LIST ) - :POSITION + 1 ) = 0
   IFTRUE OUTPUT :LIST
   IFFALSE OUTPUT DELETE.FROM.POS :POSITION
      ( BUTFIRST :LIST )
END

TO OUTPUT.TO.POS :POSITION :LIST
   OUTPUT DELETE.FROM.POS ( :POSITION + 1 )
      :LIST
END
```

Finally, as shown in Listing 14, we can put two of these procedures together to output the middle of the LIST from the START element to the FINISH element.

Listing 14.

```
TO OUTPUT.MIDDLE :START :FINISH :LIST
   OUTPUT DELETE.TO.POS ( :START - 1 )
      DELETE.FROM.POS ( :FINISH + 1 ) :LIST
END
```

Set Operations in LOGO

Set theory has become part of what is called the "new math." It has numerous applications including the study of logic and calculation of probabilities of winning in games of chance. As "new math," sets are often introduced to children in elementary school. This can present quite a challenge to parents (who may still be struggling with the "old" math) when they are asked to help with homework. LOGO can help in this struggle, because LOGO's list-processing capabilities make manipulating sets easy.

Listing 15.

```
TO UNION :SET1 :SET2
   IF :SET1 = [] THEN OUTPUT :SET2
   TEST MEMBER? ( FIRST :SET1 ) :SET2
   IFTRUE OUTPUT UNION ( BUTFIRST :SET1 )
      :SET2
   IFFALSE OUTPUT FPUT FIRST :SET1
      UNION ( BUTFIRST :SET1 ) :SET2
END

TO INTERSECTION :SET1 :SET2
   IF :SET1 = [] THEN OUTPUT []
   TEST MEMBER? ( FIRST :SET1 ) :SET2
   IFTRUE OUTPUT FPUT FIRST :SET1
      INTERSECTION ( BUTFIRST :SET1 ) :SET2
   IFFALSE OUTPUT INTERSECTION
      ( BUTFIRST :SET1 ) :SET2
END

TO DIFFERENCE :SET1 :SET2
   ;COMMENT -- OUTPUTS A-B
   IF :SET1 = [] THEN OUTPUT []
   TEST MEMBER? ( FIRST :SET1 ) :SET2
   IFTRUE OUTPUT DIFFERENCE
      ( BUTFIRST :SET1 ) :SET2
   IFFALSE OUTPUT FPUT FIRST :SET1
      DIFFERENCE ( BUTFIRST :SET1 ) :SET2
END
```

In set theory, there are three primary operations: union, intersection and difference of sets. All other set operations can be built from various combinations of these three.

A few definitions and examples are in order. The *union* of two sets is the set of elements which are contained in the first set, in the second set, and in both sets. For example, if set A consists of [Dave Jeff Jodie] and set B is [Jeff Ann], then the union of A and B would be the set consisting of [Dave Jeff Jodie Ann]. The *intersection* of two sets is the set of elements that are in both sets, in this case [Jeff]. The *difference* of two sets is the set of elements which are in the first set but are not in the second set. For example, the difference of A and B (written as A-B) is [Dave Jodie].

Because sets are similar to lists, LOGO is an excellent language for dealing with sets. First define the basic set operations of union, intersection and difference as shown in Listing 15.

In set theory, it is often necessary to test sets for various conditions. For example, we may wish to see if two sets are *equal*—that is, if they have all of the same elements, even if the elements are arranged in different orders. Or we may need to know whether a set is a *subset* of another set. A set is a subset of another set if all of its elements are also in the other set. For example, [Dave Jodie] would be a subset of [Ann Jodie Dave] but [Jeff Dave] would not be a subset.

Finally, we often wish to know if two sets are *disjoint*, i.e., they have no elements in common other than the null or empty set. The procedures in Listing 16 will test whether these set conditions are met and output a TRUE or FALSE accordingly.

Listing 16.

```
TO SUBSET? :SET1 :SET2
   ;COMMENT -- TESTS SET1 AS SUBSET OF SET2
   IF :SET1 = [] THEN OUTPUT "TRUE
   TEST MEMBER? ( FIRST :SET1 ) :SET2
   IFTRUE OUTPUT SUBSET? ( BUTFIRST :SET1 )
      :SET2
   IFFALSE OUTPUT "FALSE
END

TO EQUAL? :SET1 :SET2
   OUTPUT ALLOF ( SUBSET? :SET1 :SET2 )
      ( SUBSET? :SET2 :SET1 )
END

TO DISJOINT? :SET1 :SET2
   OUTPUT INTERSECTION :SET1 :SET2 = []
END
```

As an example of how these set operations might be used in LOGO, let's consider a typical set theory exercise. We have a class of students. We know the following facts about the class:

(1) The girls are Ann, Jodie, Wendy, Diane, Cybil and Betty.
(2) The BASIC programmers are Larry, Ann, Mike, Diane and Jodie.
(3) The LOGO programmers are Mike, Ann, Fred, George and Sean.
(4) Only three students in the class [Cybil, Wendy and Quinn] do not know either BASIC or LOGO.

You want to use set theory to determine the answers to the following questions:

(1) How many students are there in the class and what are their names?
(2) What are the boys' names?
(3) Which students are multilingual?
(4) Which boys know BASIC?

Conveniently, all of the names begin with different first letters, so we can shorten our LOGO program by just using the first letter for each student. Listing 17 shows how to set up the procedures.

Listing 17.

```
MAKE "GIRLS [A J W D C B]
MAKE "BASIC [L A M D J]
MAKE "LOGO [M A F G S]
MAKE "NONE [C W Q]
MAKE "STUDENTS UNION :GIRLS :BASIC
MAKE "STUDENTS UNION :STUDENTS :LOGO
MAKE "STUDENTS UNION :STUDENTS :NONE
MAKE "NUMBER COUNT :STUDENTS
MAKE "BOYS DIFFERENCE :STUDENTS :GIRLS
MAKE "MULTILINGUAL INTERSECTION :BASIC :LOGO
MAKE "BASIC.BOYS.1 DIFFERENCE :BASIC :GIRLS
MAKE "BASIC.BOYS.2 INTERSECTION :BOYS :BASIC
MAKE "SAME? EQUAL? :BASIC.BOYS.1 :BASIC.BOYS.2
```

Notice in Listing 17 that there are two ways to determine the boys who know BASIC and the fact that they yield the same results is tested in the last line with a call to the EQUAL? routine. Although this exercise is fairly trivial, the same kind of LOGO operations can also be used with very large and complex sets to perform manipulations that would be difficult to do in one's head or even with paper and pencil.

Sorting and Merging Lists

The first procedure we need to develop to sort or merge two lists is a routine that will enable us to compare two elements and decide whether one is smaller than the other (if they are numbers) or if one comes before the other alphabetically (if they are words or letters). Also since we want our ultimate sort procedure to work with a mixture of words and numbers, our element comparison routine needs to be able to compare a number and a word and decide which one is "smaller."

Fortunately, LOGO has a built-in ASCII function that enables us to do this. ASCII takes a single character as input and returns as an output its ASCII value where the ASCII value of a digit is less than the ASCII value of a letter. The procedure in Listing 18 uses the ASCII function to output a TRUE or FALSE depending upon whether element one (E1) is smaller numerically or whether it comes before element two (E2) alphabetically.

Listing 18.

```
TO PRECEDE? :E1 :E2
   TEST ALLOF ( NUMBER? :E1 ) ( NUMBER? :E2 )
   IFTRUE IF :E1 < :E2 THEN OUTPUT "TRUE
      ELSE OUTPUT "FALSE
   IF :E1 = " THEN OUTPUT "TRUE
   IF :E2 = " THEN OUTPUT "FALSE
   IF ASCII ( FIRST :E1 ) < ASCII ( FIRST :E2 )
      THEN OUTPUT "TRUE
   IF ASCII ( FIRST :E1 ) > ASCII ( FIRST :E2 )
      THEN OUTPUT "FALSE
   OUTPUT PRECEDE? BUTFIRST :E1 BUTFIRST :E2
END
```

Once defined, the procedure in Listing 18 can be used to output the larger or smaller of two elements as shown in Listing 19. These two procedures can then be used to output the largest or smallest element of a LIST by recursively looking at each element and comparing it to the largest or smallest element found so far. This process is shown in Listing 20.

Listing 19.

```
TO SMALLER :E1 :E2
   TEST PRECEDE? :E1 :E2
   IFTRUE THEN OUTPUT :E1
   IFFALSE THEN OUTPUT :E2
END

TO LARGER :E1 :E2
   TEST PRECEDE? :E1 :E2
   IFTRUE THEN OUTPUT :E2
   IFFALSE THEN OUTPUT :E1
END
```

Listing 20.

```
TO SMALLEST :LIST
   IF ( COUNT :LIST ) = 1 THEN OUTPUT
      FIRST :LIST
   OUTPUT SMALLER ( FIRST :LIST ) SMALLEST
      BUTFIRST :LIST
END

TO LARGEST :LIST
   IF ( COUNT :LIST ) = 1 THEN OUTPUT
      FIRST :LIST
   OUTPUT LARGER ( FIRST :LIST ) LARGEST
      BUTFIRST :LIST
END
```

Remember that the evaluations all depend upon PRECEDE? which considers numbers to be "smaller" than words. As a result, if you PRINT SMALLEST [ONE 2 THREE 4], you will get "2" and if you printed the LARGEST value of the same list, you would get "THREE."

Now that we have a procedure to identify the extreme values of a list, we need corresponding procedures to output the list without those extreme values. Using the BUTWORD procedure described earlier, we can construct two new procedures that output everything in the list except a copy of the largest element or everything except a copy of the smallest element, as shown in Listing 21.

Listing 21.

```
TO BUTSMALLEST :LIST
   OUTPUT BUTWORD ( SMALLEST :LIST ) :LIST
END

TO BUTLARGEST :LIST
   OUTPUT BUTWORD ( LARGEST :LIST ) :LIST
END
```

Our sort procedures can then be written by combining these last four procedures in one procedure, Listing 22. Using these procedures, it is possible to sort lists that contain both numbers and words. For example, PRINT SORT.UP [THREE 4 2 ONE] will print [2 4 ONE THREE].

Listing 22.

```
TO SORT.UP :LIST
   ;COMMENT -- SORTS IN ASCENDING ORDER
   IF :LIST = [] THEN OUTPUT []
   OUTPUT FPUT SMALLEST :LIST SORT.UP
      BUTSMALLEST :LIST
END

TO SORT.DOWN :LIST
   ;COMMENT -- SORTS IN DESCENDING ORDER
   IF :LIST = [] THEN OUTPUT []
   OUTPUT FPUT LARGEST :LIST SORT.DOWN
      BUTLARGEST :LIST
END
```

These sort routines work very well for small lists, but for larger lists they are too slow to be practical. For example, to sort a list with 30 elements will take two to three minutes on the Commodore 64, depending upon the mix of numbers to words within the list. Numbers sort faster than words, generally.

To ease this speed problem, let's develop some procedures to merge elements into lists that have already been sorted. In this way, we have to sort our basic list only once. Every element we then wish to add can simply be inserted or merged into this sorted list in the proper order—resulting in a great deal of time savings for large lists. The procedure in Listing 23, for instance, will merge a single ELEMENT into a previously sorted LIST.

Listing 23.

```
TO MERGE.ELEMENT :ELEMENT :LIST
   ;COMMENT -- LIST IN ASCENDING ORDER
   IF :LIST = [] THEN OUTPUT FPUT :ELEMENT
      :LIST
   TEST PRECEDE? :ELEMENT FIRST :LIST
   IFTRUE OUTPUT FPUT :ELEMENT :LIST
   IFFALSE OUTPUT FPUT ( FIRST :LIST )
      MERGE.ELEMENT :ELEMENT BUTFIRST :LIST
END
```

The merging process can be made even easier with the procedure in Listing 24, which will merge a randomly ordered list (LIST1) of elements into a list (LIST2) that has already been sorted into ascending order.

Listing 24.

```
TO MERGE.LIST :LIST1 :LIST2
   ;COMMENT -- LIST2 IN ASCENDING ORDER
   LOCAL "NEW
   MAKE "NEW MERGE.ELEMENT ( FIRST :LIST1 )
      :LIST2
   IF ( COUNT :LIST1 ) = 1 THEN OUTPUT :NEW
   OUTPUT MERGE.LIST ( BUTFIRST :LIST ) :NEW
END
```

MERGE.LIST in Listing 24 is relatively speedy—by LOGO standards. For example, merging five unsorted elements into a sorted list of 25 elements takes about ten seconds—compared to sorting the entire combined 30-element list, which would take several minutes. ■

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User Group Support Program

Commodore is creating a program to support Commodore User Groups.

The two major components—an electronic bulletin board on CompuServe and a newsletter are now available.

The electronic bulletin board is a dedicated section of the Commodore Information Network of CompuServe accessible only by "Approved" User Groups. It will be used for direct communication as well as Commodore announcements.

The newsletter, INPUT/OUTPUT, will include announcements, user group programs, calender of events, letters, questions, product specifications, programs, and surveys. It will be a newsletter FOR user groups BY user groups supported by Commodore without advertisements.

For future issues of the newsletter Commodore is accepting announcements of user group activities, articles of interest, letters to the editor, and general questions. Please forward all correspondence with the name of your user group to:

Commodore Business Machines
1200 Wilson Drive
West Chester, PA 19380
Attn: Jim Gracely

GLITCH FIX

December/January 1984-85 (Issue 12)

"Enhance Your BASIC Game with an Interrupt"

Author Mark Jordan suggests making the following changes to the program to enhance its operation:

In line 550 change the first number following the word DATA from 37 to 41. In line 550, change the fifth number after DATA from 5 to 9.

February/March 1985 (Issue 13)

"Birthday Card"

Corrections should be made to the following lines:

```
50 PRINT"{CLEAR,DOWN2,SPACE8}
   TOUCH ANY KEY, SWEETIE"'BAMJ
145 PRINT,"{L. BLUE,LEFT2,CMDR +2,
    SPACE4,CMDR +2,SPACE3}",,;'BEUK
150 PRINT,,"{LEFT2} {CMDR +2,SPACE2,
    CMDR +2,SPACE4,CMDR +3,SPACE4,
    CMDR +,SPACE3,CMDR +}"'BCDJ
155 PRINT,"{LEFT2,SPACE2,CMDR +4,SPACE4,
    CMDR +,SPACE3,CMDR +,SPACE3,
    CMDR +,SPACE3,CMDR +,RIGHT9}";'BCNP
160 PRINT,"{LEFT2,SPACE3,CMDR +2,SPACE5,
    CMDR +,SPACE3,CMDR +,SPACE3,
    CMDR +,SPACE3,CMDR +}"'BBLJ
165 PRINT,"{LEFT2,SPACE3,CMDR +2,SPACE5,
    CMDR +,SPACE3,CMDR +,SPACE3,
    CMDR +,SPACE3,CMDR +,RIGHT9}";'BCYP
170 PRINT,"{LEFT2,SPACE3,CMDR +2,SPACE6,
    CMDR +3,SPACE5,CMDR +3}"'BBXK
330 PRINT,,"{RED,DOWN13,SPACE5}LOVE,",,,
    "{SPACE5}MARK":  REM   YOUR NAME
    HERE'CSKK
345 FOR T=1 TO 23:PRINT"{RVS,SPACE3,
    SHFT S,SPACE2}",,,"{RIGHT5,SPACE 2,
    SHFT S,SPACE2}";:NEXT'FKOO
```

"In-Between"

Correct line 310 to read as follows:

```
310 PRINT"{HOME,DOWN11}":FOR Z=1 TO 9
    :PRINT"{RVS,GREEN,RIGHT4,SPACE12}"
    NEXT'GGNF
```

April/May (Issue 14)

"Bit Banner"

These four lines need to be changed:

```
80 PRINT"[SPACE10,CMDR +3,SPACE2,
   CMDR +5]"'BAFL

110 PRINT"[SPACE9,CMDR +5,SPACE2,
    CMDR +4,SPACE4]SYMBOL"'BABG

140 PRINT"[SPACE6,CMDR @,SPACE2,
    CMDR +,SPACE3,CMDR +] [CMDR +5,
    SPACE2,CMDR @,BACK ARROW]
    HEIGHT (11 MAX)"'BAAL

170 PRINT"MARGIN[SHFT K] [CMDR M2,
    SPACE3,CMDR M2,BACK ARROW]
    SPACING"'BAFK
```

"Lunar Lander"

Change the following lines:

```
6 PRINT"[WHITE,CLEAR,DOWN10,SPACE10]
  REAL TIME LUNAR LANDER"'BAAN

470 PRINT"[DOWN2,RIGHT8,SPACE3,RVS]
    THROTTLE LOCKED UP"'BAYM
471 PRINT"[RIGHT10,SPACE3,RVS]
    RETROS FIRING"'BAVL
472 PRINT"[RIGHT10,SPACE3,RVS]
    BEGIN LANDING[RVOFF]"'BACN

482 PRINT"[DOWN2,RIGHT9,SPACE5,RVS]
    WAY TOO HARD[RVOFF]"
    :POKE 2042,253'CJAQ

490 PRINT"[DOWN2,RIGHT8,SPACE2,RVS]
    NOT SO HOT, BUT[RVOFF]"'BALN
491 PRINT"[DOWN2,RIGHT8,SPACE4,RVS]
    YOU MADE IT[RVOFF]"'BASN
```

"Build Your Own Computer Control System"

We omitted the address of Genesis Computer Company, one of the companies mentioned as a good resource. You can contact Genesis at:

Ben Franklin Technology Center
Lehigh University
Bethlehem, PA 18015
215-861-0850

"List Processing in LOGO"

We are embarassed to admit that we left out the whole last part of David's "Mastermind" program. Please add these lines to the end of the listing that appeared:
(long LOGO listing)

```
TO GET.GUESS
    .GCOLL
    CURSOR 0 23 BLANKS
```

Continued next page

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GLITCH FIX

```
     CURSOR 0 23 PRINT1 [ENTER GUESS:] MAKE "GUESS MAKE.LIST
          FIRST REQUEST
     IF NOT ( COUNT :GUESS ) = :NCODE THEN ERROR 1
     MAKE "TRY 1 + :TRY
     MAKE "G :GUESS
     MAKE "C :CODE
     MAKE "BLACK MATCHES :G :C
     ELIMINATE.MATCHES :NCODE
     MAKE "WHITE COUNT INTERSECTION :C :G
     CURSOR 0 :TRY PRINT :TRY
     CURSOR 2 :TRY ( PRINT [:] :GUESS [: MATCHES] :BLACK
          [LETTERS] :WHITE )
     IF :BLACK = :NCODE THEN ERROR 0
     IF :TRY = 22 THEN ERROR 2
     GET.GUESS
END


TO SELECT.RANDOM :LIST
     COMMENT [OUTPUTS A RANDOM ELEMENT OF :LIST]
     OUTPUT ITEM ( 1 + RANDOM ( COUNT :LIST ) ) :LIST
END


TO MATCHES :LIST1 :LIST2
     COMMENT [OUTPUTS NUMBER OF TIMES CORRESPONDING ELEMENTS
          OF :LIST1 AND :LIST2 ARE IDENTICAL]
     IF :LIST1 = [] THEN OUTPUT 0
     IF :LIST2 = [] THEN OUTPUT 0
     TEST FIRST :LIST1 = FIRST :LIST2
     IFTRUE OUTPUT 1 + MATCHES ( BUTFIRST :LIST1) ( BUTFIRST
          :LIST2 )
     IFFALSE OUTPUT MATCHES ( BUTFIRST :LIST1) ( BUTFIRST
          :LIST2 )
END


TO ELIMINATE.MATCHES :M
     IF :M = 0 THEN STOP
     TEST ITEM :M :GUESS = ITEM :M :CODE
     IFTRUE MAKE "G DELETE.POS :M :G MAKE "C DELETE.POS
          :M :C
     ELIMINATE.MATCHES :M - 1
END


TO INTERSECTION :LIST1 :LIST2
     COMMENT [OUTPUTS THE INTERSECTION OF :LIST1 AND :LIST2]
     IF :LIST1 = [] THEN OUTPUT []
     TEST MEMBER? ( FIRST :LIST1 ) :LIST2
     IFTRUE OUTPUT FPUT FIRST :LIST1 INTERSECTION ( BUTFIRST
          :LIST1 ) :LIST2
     IFFALSE OUTPUT INTERSECTION ( BUTFIRST :LIST1 ) :LIST2
END


TO DELETE.POS :POSITION :LIST
     COMMENT [OUTPUTS LIST AFTER DELETING WORD IN :POSITION]
     IF :POSITION = 1 THEN OUTPUT BUTFIRST :LIST
     OUTPUT FPUT FIRST :LIST DELETE.POS ( :POSITION - 1 )
          ( BUTFIRST :LIST )
END


TO ERROR :N
     CURSOR 0 23 BLANKS CURSOR 0 23
     IF :N = 1 ( PRINT [YOUR GUESS SHOULD BE] :NCODE
          [CHARACTERS!] ) WAIT 200 GET.GUESS
     IF :N = 2 ( PRINT [THE CODE WAS:] :CODE ) AGAIN?
PRINT1 SENTENCE [YOU GOT IT ON THE] :TRY PRINT [-TH TRY!!]
          AGAIN?
END


TO AGAIN?
     CURSOR 0 24 PRINT1 [TRY AGAIN ?] MAKE "KEY FIRST.LETTER
     IF :KEY = "Y THEN GAME
     CLEARTEXT
     PRINT [THANKS FOR THE GAME!]
     TOPLEVEL
END


TO BLANKS
     REPEAT 40 [PRINT1 CHAR 32]
END


TO WAIT :N
     IF :N = 0 THEN STOP
     WAIT :N - 1
END


TO COMMENT :L
END
```

END

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BERSERKER

Continued from pg. 36

as "value," a number which provides a rough estimate of how long it takes to complete the craft in question. In general, the human commander builds armed or unarmed merchant vessels to establish new bases and cruisers or battleships for attack and defense.

Sooner or later, the gamer must test the quality of the preparations in the fires of combat. Fighting occurs whenever a Berserker invades a planet controlled by a human player, two human-directed forces land on a planet simultaneously or a human fleet reaches a Berserker-dominated world.

A player allocates energy points, equal to a ship's power drive, prior to every round of combat. The points are divided among four variables: speed, beams, shields and tubes. Speed is crucial in combat against another ship, because the faster vessel scores a hit 75% of the time, but the slower ship has only a 50% success chance. Beams are primarily used against bases, while tubes are the main weapon against rival vessels. Shields denote the number of hit points of damage which a ship can withstand during a single round of combat. Incoming fire which gets through the shields causes reductions in the ship's basic parameters, hindering future operations until a friendly base repairs it.

Since only three ships can receive an attack order in a combat turn, the player must deliberate the importance of any single fight to the overall situation. Unplanned fighting can leave the defenders scattered thinly throughout a whole star sector, easy prey for the mechanoid marauders.

In planet combat, an operational base shoots missiles at any would-be invaders. A base has an unlimited stockpile of missiles, but the facility's point-value controls the number which can be launched in a given turn.

Berserker Raids won't satisfy those who want the crash and zap of futuristic warfare. It's just not that kind of game. This program rewards meticulous, well-coordinated planning, not military genius. The resulting contest seems a lot less lively than most other computer science fiction titles, but may appeal to those who especially enjoy economic and political games. C

WORD GAMES

Continued from pg. 87

program, it's moderately amusing and does make the weekly spelling lesson more tolerable.

Cave of the Word Wizard

Cave of the Word Wizard (Timeworks, 444 Lake Cook Road, Deerfield, IL 60015/disk) casts its spelling lessons in the form of an action-adventure game. The gamer uses a joystick to guide an on-screen character, either Mark or Becky, through a mysterious cave filled with pitfalls, scorpions, serpents and other dangers. Equipped only with a flashlight and a limited supply of Band-aids to heal wounds, the gamer must traverse eight levels of tunnels, hopping over obstacles along the way, to locate four magic crystals.

To make a bad situation worse, the batteries in the flashlight are nearly dead. The only way to replenish them is to correctly spell words presented by the Wizard, a Gandalfian image with white hair, beard and flowing robe. The Wizard appears randomly and challenges Mark or Becky to spell the word he speaks. A correct response recharges the flash batteries. In case of an error, the wizard displays the right spelling on the screen.

The gamer descends to lower levels through holes in the floor and returns to the upper levels by ladders. Returning to the surface with the four crystals wins the game.

Cave of the Word Wizard is for the young, or at least the young-at-heart. The four skill levels start with simple (cat-dog-baby) words and few interruptions from cave creatures and advance to very difficult ones (unanimous-pterodactyl-photosynthesis) and a high incidence of random dangers. So the game is playable by computerists from six to adult.

Word games have come full circle in the computer world. The primitive word-search routines that amused basement hackers in microcomputer's dawn seem pathetically simple by current software standards. Today's programs wed the stimulation of manipulating the language to the audio-visual fireworks possible with computers. And as technology progresses, word games will also mutate. Indeed, the future looks bright with possibilities for those who love to play with words. C

HOW TO ENTER PROGRAMS in *Power/Play*

The programs which appear in this magazine have been run, tested and checked for bugs and errors. After a program is tested, it is printed on a letter quality printer with some formatting changes. This listing is then photographed directly and printed in the magazine. Using this method ensures the most error-free program listings possible.

Whenever you see a word inside brackets, such as [DOWN], the word represents a keystroke or series of keystrokes on the keyboard. The word [DOWN] would be entered by pressing the cursor-down key. If multiple keystrokes are required, the number will directly follow the word. For example, [DOWN4] would mean to press the cursor-down key four times. If there are multiple words within one set of brackets, enter the keystrokes directly after one another. For example, [DOWN,RIGHT2] would mean to press the cursor-down key once and then the cursor-right key twice.

In addition to these graphic symbols, the keyboard graphics are all represented by a word and a letter. The word is either SHFT or CMD and represents the SHIFT key or the Commodore key. The letter is one of the letters on the keyboard. The combination [SHFT E] would be entered by holding down the SHIFT key and pressing the E. A number following the letter tells you how many times to type the letter. For example, [SHFT A4,CMD B3] would mean to hold the SHIFT key and press the A four times, then hold down the Commodore key and press the B three times.

The following chart tells you the keys to press for any word or words inside of brackets. Refer to this chart whenever you aren't sure what keys to press. The little graphic next to the keystrokes shows you what you will see on the screen.

SYNTAX ERROR

This is by far the most common error encountered while entering a program. Usually (sorry folks) this means that you have typed something incorrectly on the line the syntax error refers to. If you get the message ''?Syntax Error Break In Line 270'', type LIST 270 and press RETURN. This will list line 270 to the screen. Look for any non-obvious mistakes like a zero in place of an O or vice-versa. Check for semicolons and colons reversed and extra or missing parenthesis. All of these things will cause a syntax error.

There is only one time a syntax error will tell you the 'wrong' line to look at. If the line the syntax error refers to has a function call (i.e., FN A(3)), the syntax error may be in the line that defines the function, rather than the line named in the error message. Look for a line near the beginning of the program (usually) that has DEF FN A(X) in it with an equation following it. Look for a typo in the equation part of this definition.

ILLEGAL QUANTITY ERROR

This is another common error message. This can also be caused by a typing error, but it is a little harder to find. Once again, list the line number that the error message refers to. There is probably a poke statement on this line. If there is, then the error is referring to what is trying to be poked. A number must be in the range of zero to 255 to be poke-able. For example, the statement POKE 1024,260 would produce an illegal quantity error because 260 is greater than 255.

Most often, the value being poked is a variable (A,X...). This error is telling you that this variable is out of range. If the variable is being read from data statements, then the problem is somewhere in the data statements. Check the data statements for missing commas or other typos.

If the variable is not coming from data statements, then the problem will be a little harder to find. Check each line that contains the variable for typing mistakes.

OUT OF DATA ERROR

This error message is always related to the data statements in a program. If this error occurs, it means that the program has run out of data items before it was supposed to. It is usually caused by a problem or typo in the data statements. Check first to see if you have left out a whole line of data. Next, check for missing commas between numbers. Reading data from a page of a magazine can be a strain on the brain, so use a ruler or a piece of paper or anything else to help you keep track of where you are as you enter the data.

OTHER PROBLEMS

It is important to remember that the 64 and the PET/CBM computers will only accept a line up to 80 characters long. The VIC 20 will accept a line up to 88 characters long. Sometimes you will find a line in a program that runs over this number of characters. This is not a mistake in the listing. Sometimes programmers get so carried away crunching programs that they use abbreviated commands to get more than 80 (or 88) characters on one line. You can enter these lines by abbreviating the commands when

CHART OF SPECIAL CHARACTER COMMANDS

''[HOME]'' = UNSHIFTED CLR/ HOME
''[CLEAR]'' = SHIFTED CLR/HOME
''[DOWN]'' = CURSOR DOWN
''[UP]'' = CURSOR UP
''[RIGHT]'' = CURSOR RIGHT
''[LEFT]'' = CURSOR LEFT
''[RVS]'' = CONTROL 9
''[RVOFF]'' = CONTROL 0
''[BLACK]'' = CONTROL 1
''[WHITE]'' = CONTROL 2
''[RED]'' = CONTROL 3
''[CYAN]'' = CONTROL 4
''[PURPLE]'' = CONTROL 5
''[GREEN]'' = CONTROL 6
''[BLUE]'' = CONTROL 7
''[YELLOW]'' = CONTROL 8
''[ORANGE]'' = COMMODORE 1
''[BROWN]'' = COMMODORE 2
''[L. RED]'' = COMMODORE 3
''[GRAY1]'' = COMMODORE 4
''[GRAY2]'' = COMMODORE 5
''[L. GREEN]'' = COMMODORE 6
''[L. BLUE]'' = COMMODORE 7
''[GRAY3]'' = COMMODORE 8
''[F1]'' = F1
''[F2]'' = F2
''[F3]'' = F3
''[F4]'' = F4
''[F5]'' = F5
''[F6]'' = F6
''[F7]'' = F7
''[F8]'' = F8
''[POUND]'' = ENGLISH POUND
''[SHFT ^]'' = PI SYMBOL
''[↑]'' = UP ARROW

GRAPHIC SYMBOLS WILL BE REPRESENTED AS EITHER THE LETTERS SHFT (SHIFT) AND A KEY (''[SHFT Q,SHFT J,SHFT D,SHFT S]'') OR THE LETTERS CMDR (COMMODORE) AND A KEY (''[CMDR Q,CMDR G,COMDR Y,CMDR H]''). IF A SYMBOL IS REPEATED, THE NUMBER OF REPITITIONS WILL BE DIRECTLY AFTER THE KEY AND BEFORE THE COMMA (''[SPACE3,SHFT S4,CMDR M2]'').

you enter the line. The abbreviations for BASIC commands are on pages 133-134 of the VIC 20 user guide and 130-131 of the Commodore 64 user's guide.

If you type a line that is longer than 80 (or 88) characters, the computer will act as if everything is ok, until you press RETURN. Then, a syntax error will be displayed.

THE PROGRAM WON'T RUN!!

This is the hardest of problems to resolve; no error message is displayed, but the program just doesn't run. This can be caused by many small mistakes typing a program in. First check that the program was written for the computer you are using. Check to see if you have left out any lines of the program. Check each line of the program for typos or missing parts. Finally, press the RUN/STOP key while the program is 'running'. Write down the line the program broke at and try to follow the program backwards from this point, looking for problems.

IF ALL ELSE FAILS

You've come to the end of your rope. You can't get the program to run and you can't find any errors in your typing. What do you do? As always, we suggest that you try a local user group for help. In a group of even just a dozen members, someone is bound to have typed in the same program.

If you do get a working copy, be sure to compare it to your own version so that you can learn from your errors and increase you understanding of programming.

If you live in the country, don't have a local user group, or you simply can't get any help, write to us. If you do write to us, include the following information about the program you are having problems with:

The name of the program
The issue of the magazine it was in
The computer you are using
Any error messages and the line numbers
Anything displayed on the screen
A printout of your listing (if possible)

Send your questions to:

Power/Play Magazine
1200 Wilson Drive
West Chester, PA 19380
ATTN: Program Problem

How to Use the Magazine Entry Program

The Magazine Entry Program on page 125 is a machine language program that will assist you in entering the programs in this magazine correctly. It is for use with the Commodore 64 only and was written by Mark Robin using the IEA Editor/Assembler. Once the program is in place, it works its magic without you having to do anything else. The program will not let you enter a line if there is a typing mistake on it, and better yet, it identifies the kind of error for you.

Getting Started

Type in the Magazine Entry Program carefully and save it as you go along (just in case). Once the whole program is typed in, save it again on tape or disk. Now RUN the program. The word POKING will appear on the top of the screen with a number. The number will increment from 49152 up to 49541, and just lets you know that the program is running. If everything is ok, the program will finish running and tell you to type NEW. If there is a problem with the data statements, the program will tell you where to find the problem.

Once the program has run, it is in memory ready to go. To activate the program, type SYS49152 and press RETURN. When the READY prompt is displayed, type TEST and press RETURN. You are now ready to enter the programs from the magazine.

Typing the Programs

All the program listings in this magazine that are for the 64 have an apostrophe followed by four letters at the end of the line (i.e., 'ACDF). The apostrophe and letters *should* be entered along with the rest of the line. This is a checksum that the Magazine Entry Program uses.

Enter the line and the letters at the end and then press RETURN, just as you normally would.

If the line is entered correctly, a bell is sounded and the line is entered into the computer's memory (without the characters at the end).

If a mistake was made while entering the line, a noise is sounded and an error message is displayed. Read the error message, then press any key to erase the message and correct the line.

IMPORTANT

If the Magazine Entry Program sees a mistake on a line, it *does not* enter that line into memory. This makes it impossible to enter a line incorrectly.

Error Messages and What They Mean

There are six error messages that the Magazine Entry Program uses. Here they are, along with what they mean and how to fix them.

NO CHECKSUM: This means that you forgot to enter the apostrophe and the four letters at the end of the line. Move the cursor to the end of the line you just typed and enter the checksum.

QUOTE: This means that you forgot (or added) a quote mark somewhere in the line. Check the line in the magazine and correct the quote.

PARENTHESIS: This means that you forgot (or added) a parenthesis somewhere in the line. Check the line in the magazine again and correct the parenthesis.

KEYWORD: This means that you have either forgotten a command or spelled one of the BASIC keywords (GOTO, PRINT..) incorrectly. Check the line in the magazine again and check your spelling.

# OF CHARACTERS: This means that you have either entered extra characters or missed some characters. Check the line in the magazine again. This error message will also occur if you misspell a BASIC command, but create another keyword in doing so. For example, if you misspell PRINT as PRONT, the 64 sees the letter P and R, the BASIC keyword ON and then the letter T. Because it sees the keyword ON, it thinks you've got too many characters, instead of a simple misspelling. Check spelling of BASIC commands if you can't find anything else wrong.

UNIDENTIFIED: This means that you have either made a simple spelling error, you typed the wrong line number, or you typed the checksum incorrectly. Spelling errors could be the wrong number of spaces inside quotes, a variable spelled wrong, or a word misspelled. Check the line in the magazine again and correct the mistake.

Magazine Entry Program

```
1 PRINT "[CLEAR]POKING-";
5 P=49152 :REM $C000
10 READ A$:IF A$="END"THEN 80
20 L=ASC(MID$(A$,2,1))
30 H=ASC(MID$(A$,1,1))
40 L=L-48:IF L>9 THEN L=L-7
50 H=H-48:IF H>9 THEN H=H-7
60 PRINT"[HOME,RIGHT12]"P;
70 B=H*16+L:POKE P,B:T=T+B:P=P+1
   :GOTO 10
80 IF T<>103233 THEN PRINT"MISTAKE IN
   DATA --> CHECK DATA STATEMENTS":END
90 PRINT"DONE":END
1000 DATA 4C,23,C0,00,00,00,00,00
1001 DATA 00,00,00,00,00,00,00,0D
1002 DATA 00,58,C1,5E,C1,66,C1,76
1003 DATA C1,83,C1,8F,C1,EA,EA,EA
1004 DATA 4C,83,C0,A2,05,BD,1D,C0
1005 DATA 95,73,CA,10,F8,60,A0,02
1006 DATA B9,00,02,D9,3C,C1,D0,0B
1007 DATA 88,10,F5,A9,01,8D,10,C0
1008 DATA 4C,1F,C1,60,A0,03,B9,00
1009 DATA 02,D9,38,C1,D0,E0,88,10
1010 DATA F5,A9,00,8D,10,C0,4C,1F
1011 DATA C1,60,A0,03,B9,00,02,D9
1012 DATA 34,C1,D0,E0,88,10,F5,A0
1013 DATA 05,B9,A2,E3,99,73,00,88
1014 DATA 10,F7,A9,00,8D,18,D4,4C
1015 DATA 1F,C1,E6,7A,D0,02,E6,7B
1016 DATA 4C,79,00,A5,9D,F0,F3,A5
1017 DATA 7A,C9,FF,D0,ED,A5,7B,C9
1018 DATA 01,D0,E7,20,5A,C0,AD,00
1019 DATA 02,20,A3,C0,90,DC,A0,00
1020 DATA 4C,EA,C1,C9,30,30,06,C9
1021 DATA 3A,10,02,38,60,18,60,C8
1022 DATA B1,7A,C9,20,D0,03,C8,D0
1023 DATA F7,B1,7A,60,18,C8,B1,7A
1024 DATA F0,35,C9,22,F0,F5,6D,05
1025 DATA C0,8D,05,C0,AD,06,C0,69
1026 DATA 00,8D,06,C0,4C,BD,C0,18
1027 DATA 6D,07,C0,8D,07,C0,90,03
1028 DATA EE,08,C0,EE,0B,C0,60,18
1029 DATA 6D,0A,C0,8D,0A,C0,90,03
1030 DATA EE,09,C0,EE,0C,C0,60,0A
1031 DATA A8,B9,11,C0,85,FB,B9,12
1032 DATA C0,85,FC,A0,00,A9,12,20
1033 DATA D2,FF,B1,FB,F0,06,20,D2
1034 DATA FF,C8,D0,F6,20,54,C3,20
1035 DATA 7E,C3,20,E4,FF,F0,FB,A0
1036 DATA 1B,B9,3F,C1,20,D2,FF,88
1037 DATA 10,F7,68,68,A9,00,8D,00
1038 DATA 02,4C,74,A4,4B,49,4C,4C
1039 DATA 54,45,53,54,41,44,44,91
1040 DATA 91,0D,20,20,20,20,20,20
1041 DATA 20,20,20,20,20,20,20,20
1042 DATA 20,20,20,20,20,20,91,0D
1043 DATA 51,55,4F,54,45,00,4B,45
1044 DATA 59,57,4F,52,44,00,23,20
1045 DATA 4F,46,20,43,48,41,52,41
1046 DATA 43,54,45,52,53,00,55,4E
1047 DATA 49,44,45,4E,54,49,46,49
1048 DATA 45,44,00,4E,4F,20,43,48
1049 DATA 45,43,4B,53,55,4D,00,50
1050 DATA 41,52,45,4E,54,48,45,53
1051 DATA 49,53,00,C8,B1,7A,D0,FB
1052 DATA 84,FD,C0,09,10,03,4C,C7
1053 DATA C1,88,88,88,88,88,B1,7A
1054 DATA C9,27,D0,13,A9,00,91,7A
1055 DATA C8,A2,00,B1,7A,9D,3C,03
1056 DATA C8,E8,E0,04,D0,F5,60,4C
1057 DATA F2,C2,A0,00,B9,00,02,99
1058 DATA 40,03,F0,F2,C8,D0,F5,A0
1059 DATA 00,B9,40,03,F0,E8,99,00
1060 DATA 02,C8,D0,F5,20,D7,C1,4C
1061 DATA 56,C2,A0,0B,A9,00,99,03
1062 DATA C0,8D,3C,03,88,10,F7,A9
1063 DATA 80,85,02,20,1B,C3,A0,00
1064 DATA 20,9B,C1,20,CA,C1,20,31
1065 DATA C2,E6,7A,E6,7B,20,7C,A5
1066 DATA A0,00,20,AF,C0,F0,CD,24
1067 DATA 02,F0,06,20,D7,C0,4C,12
1068 DATA C2,C9,22,D0,06,20,BC,C0
1069 DATA 4C,12,C2,20,E7,C0,4C,12
1070 DATA C2,A0,00,B9,00,02,20,A3
1071 DATA C0,C8,90,0A,18,6D,09,C0
1072 DATA 8D,09,C0,4C,33,C2,88,A2
1073 DATA 00,B9,00,02,9D,00,02,F0
1074 DATA 04,E8,C8,D0,F4,60,18,AD
1075 DATA 0B,C0,69,41,8D,0B,C0,38
1076 DATA AD,0C,C0,E9,19,90,06,8D
1077 DATA 0C,C0,4C,60,C2,AD,0C,C0
1078 DATA 69,41,8D,0C,C0,AD,05,C0
1079 DATA 6D,07,C0,48,AD,06,C0,6D
1080 DATA 08,C0,8D,0E,C0,68,6D,0A
1081 DATA C0,8D,0D;C0,AD,0E,C0,6D
1082 DATA 09,C0,8D,0E,C0,38,E9,19
1083 DATA 90,06,8D,0E,C0,4C,96,C2
1084 DATA AD,0E,C0,69,41,8D,0E,C0
1085 DATA AD,0D,C0,E9,19,90,06,8D
1086 DATA 0D,C0,4C,AB,C2,AD,0D,C0
1087 DATA 69,41,8D,0D,C0,A0,01,AD
1088 DATA 0B,C0,CD,3C,03,D0,20,C8
1089 DATA AD,0C,C0,CD,3D,03,D0,17
1090 DATA C8,AD,0D,C0,CD,3E,03,D0
1091 DATA 0E,AD,0E,C0,CD,3F,03,D0
1092 DATA 06,20,64,C3,4C,7A,C0,AD
1093 DATA 10,C0,D0,11,98,48,68,4C
1094 DATA F7,C0,AD,10,C0,F0,01,60
1095 DATA A9,04,4C,F7,C0,A4,FD,A9
1096 DATA 27,91,7A,A2,00,C8,BD,0B
1097 DATA C0,91,7A,C8,E8,E0,04,D0
1098 DATA F5,A9,00,91,7A,20,64,C3
1099 DATA 4C,7A,C0,A0,00,B9,00,02
1100 DATA F0,11,C9,28,D0,03,EE,03
1101 DATA C0,C9,29,D0,03,EE,04,C0
1102 DATA C8,D0,EA,AD,03,C0,CD,04
1103 DATA C0,D0,01,60,A9,05,4C,F7
1104 DATA C0,A9,20,8D,00,D4,8D,01
1105 DATA D4,A9,09,8D,05,D4,A9,0F
1106 DATA 8D,18,D4,60,20,41,C3,A9
1107 DATA 81,20,77,C3,A9,80,20,77
1108 DATA C3,4C,71,C3,20,41,C3,A9
1109 DATA 11,20,77,C3,A9,10,20,77
1110 DATA C3,A9,00,8D,04,D4,60,8D
1111 DATA 04,D4,A2,70,A0,00,88,D0
1112 DATA FD,CA,D0,FA,60,END
```

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Circle Reader Service No. 8

HOT ROLES

Continued from pg. 77

tience is not only a virtue; it's a necessity.

For those dauntless squires who can't seem to get enough, the same kind of challenge, with a little more depth (literally and figuratively), can be found in Electronic Arts' *The Standing Stones.*

Structurally, these games are almost identical. This time you are searching for Merlin's Grail, lifted by the sticky fingers of Kormath, a misguided mage. The screen displays, battle sequences, motion commands and player strategies are all similar. But as you roam the catacombs, some refreshing enhancements are unveiled.

A most welcome addition is your sidekick, Lancelot. Although you control only a single explorer in this game, you are certainly not alone. On the uppermost levels of the 15-floor pit, whenever you inevitably back yourself into a corner and your enemy is about to deliver the death blow, all is not lost. For out of the mist, with a razor-sharp sword in hand and a gleam in his eye, comes the ever reliable (fanfare please) Sir Lancelot. This knight of uncommon valor will aid you immeasurably during the opening rounds, cutting down your opponents when your lack of experience leaves you most susceptible.

This game also houses the weaker attackers close to the surface, so you have time to build experience without succumbing prematurely. Granted, the deeper into the earth's crust you travel, the stiffer the competition, but this contest seems more interested in drawing you in than killing you off.

This fact is further evidenced by the goodies the designers have left littered in the maze, items which give valued assistance while keeping the element of surprise consistent throughout. There are magic artifacts like potions, scrolls, books, rings, armor and illuminated arrows, which will lead you to the dungeon's exit so you can restore your character. Then there's the oasis, where an adventurer can try his luck and win some gold at the casino games or infamous roach races. There are also locked chests filled with hidden treasure—or traps. And, of course, there is the Grail, the holiest of goblets, which must be retrieved and returned to daylight to complete your task.

Menacing minds might also want to try the Dungeon Master option this disk contains, allowing the true madman to rearrange the labyrinth's magic and monsters. Aside from being a method of slowly driving your uninformed fellow searchers insane, it's also a device for taking control of a maze that has been previously conquered and presenting some new obstacles for epicures of punishment. This *is* a never ending challenge.

Now, if you would be so kind as to excuse me, I'm going to try and pierce that dragon's heart with this toothpick. Why would I try such a foolhardy act, running headlong into the jaws of danger? Well, I'm really not as brave, or stupid, as I seem. Because in adventure gaming, death isn't always as it seems.

In the Infocom contests, for example, you can "save" any progress you've made to a supplementary disk and return to that point if you meet up with bad fortune. And in the maze contests, when you reach the end of your rope, you can either revitalize by entering a secret code (*Maze Master*) or resurrect your surrogate by sacrificing some gold and experience (*The Standing Stones*).

So throw caution to the wind, loosen your grip on reality, and don't be afraid to attempt the outrageous. There are worlds of adventure begging to be explored, flesh-feasting creatures ready to be had, and countless riches waiting to be claimed.

Strap on your chain mail, pack up your spell book and swing your runemace overhead. Go forth and may the higher gods shower you with blessings. C

Enchanter
Sorcerer
Infocom
55 Wheeler Street
Cambridge, MA 02138

Maze Master
HesWare
150 N. Hill Drive
Brisbane, CA 94005

The Standing Stones
Electronic Arts
2755 Campus Drive
San Mateo, CA 94403

POWER PLAY'S NEWS FROM THE BACK

MIT
MUPPET INSTITUTE OF TECHNOLOGY

The Muppet Institute of Technology helps children develop their reading, writing, vocabulary and story-building skills.

Muppet Institute of Technology

The first in a series of educational programs to be marketed under the Muppet Institute of Technology banner has been introduced by Simon & Schuster's Electronic Publishing Group (1230 Avenue of the Americas, New York, NY 10020). The two programs for the Commodore 64, **Kermit's Electronic Storymaker** and **The Great Gonzo in Wordrider**, are full of the personality of the Muppets and provide learning in a fun and creative environment.

The educational philosophy behind "MIT" (Muppet Institute of Technology) is simply to follow children's natural approach to learning—playful, light-hearted and fun. In order to achieve this, Simon & Schuster teamed the efforts of Henson Associates, creators of the Muppets; Christopher Cerf; and Joyce Hakansson Associates, one of the foremost educational software design groups.

Trolls and Tribulations

Woeful is the troll who doesn't act quickly in **Trolls and Tribulations**, the new strategy action game now available from Creative Software (960 Hamlin Court, Sunnyvale, CA 94089) for the Commodore 64.

In **Trolls and Tribulations**, the player must lead trolls through treacherous underground caverns to recover treasures that have been hidden there for centuries. The obstacles are many: lurking in the mazes are troll-crunching cretins, hungry buzzards, ghastly skulls and sinister spiders, all intent on keeping the treasures within the walls of their wicked world.

Your success depends on your skill in combatting the cretins and the wisdom with which you choose your path. The game begins with six trolls and each time a troll is lost, the next troll picks up the expedition from the beginning of the maze in process.

Points are collected by destroying cretins, recovering hidden treasures and opening doors. There's help along the way with trampolines to help the trolls jump to high ledges and the ability to reload the troll's gun when it runs out of bullets. But there are also obstructions, such as doors that won't open unless you've picked up the keys which are hidden in the maze.

The game retails for $24.95.

Micro Diary for the Commodore 64

Micro Diary is a telephone-dialing directory tool for the Commodore computers released by Expertel Inc. (9669 Distribution Avenue, San Diego, CA 92121). The software stores up to 2,000 names, phone numbers, addresses and any other important information. Phone numbers are accessed by entering partial names—not codes—and the program finds all names with those letters. A single keystroke lets you dial the phone number, including long distance access codes.

Micro Diary acts as an appointment notebook, keeping track of your notes and a daily calendar, plus a tickler file to call your attention to important matters. The program also performs searches and offers a flexible routine for printing your directory, notes, calendar and mailing labels.

Micro Diary can be used with most auto-dial modems or with the companion telephone interface unit, **Micro Unit**, which retails for $50. The FCC-approved **Micro Diary** costs $65.

SKY TRAVEL CHALLENGE

Sky Travel Challenge: Answers

Destroy Before Reading

1. Polar bear in Alert, Canada, 82°N −63°W, visible 3000 B.C. to 3000 A.D., N
   Clue is obvious.
2. Empire State Building, New York, 40°43′N −74°01′W, May 1937 to May 2937, SSW
   Clue is "empirically stated" + "billing" + "top."
3. CN Tower in Toronto, 43°42′N −79°18′W, January 1970 to January 2070, SW
   Clue is "see an" = "CN"; "two on tour = Toronto backwards, "highest" + "without . . . support" = CN Tower is tallest unsupported structure.
4. Gateway Arch in St. Louis, 38°38′N −90°11′W, July 1948 to July 2948, NNE
   Clue is Gateway Arch looks exactly like half of a MacDonald's sign, so . . . "hungry", "half-wit," and "hamburgers" give it away.
5. Mount Fuji in Tokyo, 35°42′N 139°48′E, 4713 B.C. to 9999 A.D., NE
   Clue is "Canadian Police" = "mountie" + "fugitive" = MOUNTie FUGItive, right?
6. St. Basil Cathedral in Moscow, 55°48′N 37°42′E, 1555 A.D. to 2001 A.D., NW
   Clue is "mosque" + "How" = Moscow.
7. Golden Gate Bridge in San Francisco, 37°48′N −122°24′W, 1937 to 2937, WNW
   Clue is "don't cross" + "until" + "come to it" = don't cross the bridge until you come to it, + "suspenseful" = suspension bridge.
8. Penguin in Sir James Ross, Antarctica, −68°S −56°W, 3000 B.C. to 3000 A.D., S
   Clue is "Betsy" as in Betsy Ross, "Jim" as in James, and "pen" + "go in" = penguin.
9. Pyramid at Giza, Egypt, 29°45′N 31°18′E, 2613 B.C. to 7000 A.D., N
   Clue is "200 steps . . ." Marks off a square like the base of the pyramid and "peer amid."
10. Eiffel Tower in Paris, 48°53′N 2°18′E, 1889 to 2889, SSE
    Clue is "plastered" = plaster of Paris, and "I fell" = Eiffel
11. Big Ben in London, 51°30′N 0°12′E, 1859 to 2859, SSW
    Clue is "gentle" as in Gentle Ben + "big" = Big Ben; "watch out" means clock.

[Author's name withheld for protection from angry readers.]

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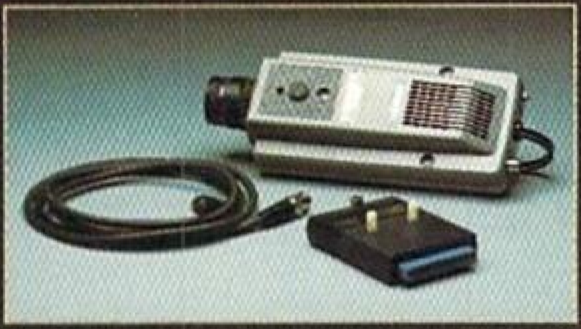

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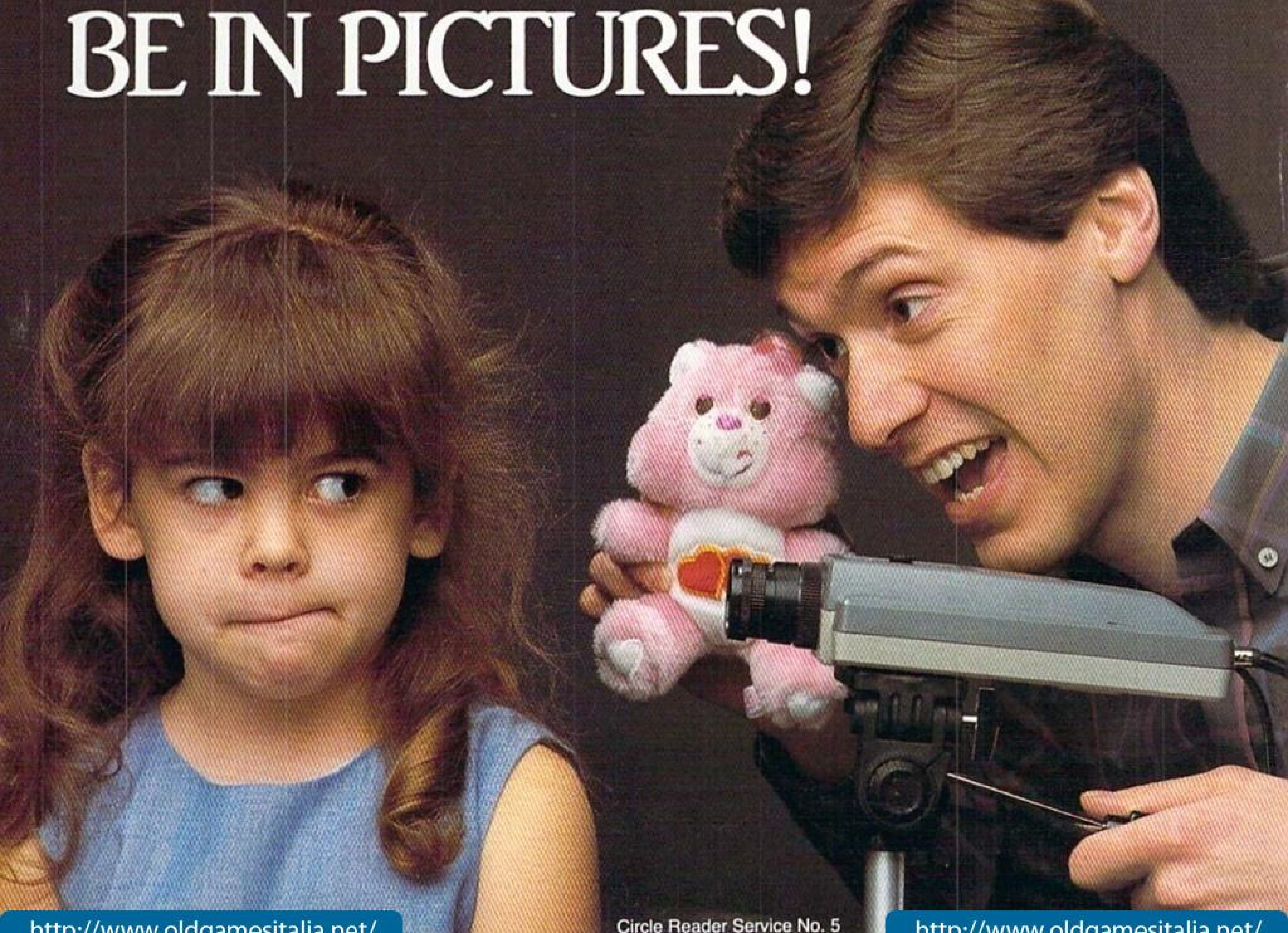

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